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Improving poverty reduction in Europe: What works best where?

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Abstract
This article examines how income poverty is affected by changes to the scale of tax-benefit policies and which are the most cost-effective policies in reducing poverty or limiting its increase in seven diverse EU countries. We do that by measuring the implications of increasing/reducing the scale of each policy instrument, using microsimulation methods while holding constant the policy design and national context. We consider commonly applied policy instruments with a direct effect on household income: child benefits, social assistance, income tax lower thresholds and a benchmark case of rescaling the whole tax-benefit system. We find that the assessment of the most cost-effective instrument may depend on the measure of poverty used and the direction and scale of the change. Nevertheless, our results indicate that the options that reduce poverty most cost-effectively in most countries are increasing child benefits and social assistance, while reducing the former is a particularly poverty-increasing way of making budgetary cuts.

Keywords
EU, microsimulation, policy reform, poverty, social and fiscal policy

Introduction

With its roots in the late 19th century, the modern welfare state is now established in all European Union (EU) member states. One of its most important missions has become poverty reduction. While combating poverty is a high-priority objective in the EU, income poverty remains persistently high or is rising in many European countries and the EU 2020 targets for poverty reduction seem unattainable (Eurostat, 2017b). It is clear that, in order to move towards the targets in a convincing way, there is need for increased and differently allocated public spending. However, in the context of the recovery from the economic crisis, or its persistence in some countries, budgetary retrenchment remains on the agenda.

Research on public redistribution has focused on tax-benefit policies, as the main tools through which governments influence distributional outcomes. The effectiveness of policies in reducing poverty depends on a number of factors. First, the environment in which they operate plays a key role. This applies to

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the characteristics of the population for whom they are intended and to the macroeconomic conditions of the time (Atkinson, 2009). Second, the effectiveness of particular policy instruments naturally depends on the specifics of their design (Avram et al., 2013; Levy et al., 2009). Third, it depends on how people react to policies. For example, targeting resources on those with low incomes may appear efficient for poverty reduction but is less so if means-testing results in incomplete benefit take-up or if benefits reduce the financial incentive to work for the recipients or others in their household (Adema et al., 2003; Bargain et al., 2007; Mood, 2006). Finally, effectiveness in reducing poverty depends on the *scale* of the policy instrument.

Research on how much 'size matters' relative to design has mainly concentrated on family policies (e.g. Matsaganis et al., (2006) for southern European countries, Levy et al. (2007) for Austria, Spain and the United Kingdom, Notten and Gassmann (2008) for Russia, Salanauskaite and Verbist (2013) for Lithuania and four other post-2004 EU member states, and Popova (2016) for Russia in comparison with four western European countries). Most findings suggest that size is the most important aspect but that specific design features may be particularly effective in poverty reduction within their national contexts.

The questions we attempt to answer in this article are the following: how are income poverty levels affected by changes to the scale of tax-benefit policies? Which are the most cost-effective policies in reducing poverty in seven diverse EU countries? With these questions in mind, we address two important limitations of the existing literature: first, while the literature mainly focuses on one type of policy (family benefits), our analysis compares across several types of policy instruments within as well as between countries. The policies considered are child benefits, social assistance benefits and income tax lower thresholds. In addition, to provide a benchmark against which to compare the effects of individual policy instruments, we consider what happens to poverty indicators if all monetary levels and thresholds in the tax-benefit system are altered. Second, while most of the literature concentrates on the poverty-reducing effectiveness of different policy designs, this research sheds light on the effectiveness of the scale of *given* policy designs; using microsimulation techniques, we explicitly measure the distributional implications of increasing or reducing the scale of each policy, holding constant its design and national context.

To assess the relative cost-effectiveness of the instruments in reducing poverty, we also contribute to the existing literature by developing an indicator, defined as the ratio of the percentage point change in poverty (headcount or gap) to the net cost to the public budget, expressed as a proportion of GDP.[1] This indicator allows us to compare the cost-effectiveness across instruments and countries in a meaningful and straightforward way.

We compare across seven EU countries chosen for their diversity of tax-benefit systems and size of policy instruments: Belgium, Bulgaria, Estonia, Greece, Hungary, Italy and the United Kingdom. These countries cover the whole spectrum of European non-pension social spending: from the high spenders (Belgium and the United Kingdom with 19.1% and 16.1% of GDP in 2013, respectively) to the low spenders (Bulgaria and Estonia with 9.4% and 8.2% of GDP in 2013, respectively).[2] Average levels also differ substantially: the mean value of child benefits (for those in receipt) varies from 6 percent of the median equivalent disposable income in Greece to 27.5 percent in Hungary. Large variations are also observed for social assistance benefit levels and the income levels at which people become liable for income tax (Table 1). This diversity is important, as it enables us to compare a number of different policy settings and, hence, reach conclusions that go beyond the seven countries in question on top of providing country-specific pointers for practical policy reform.

We use EUROMOD, the tax-benefit microsimulation model for the European Union and household micro-data, representative of the national populations. Combining EUROMOD with the micro-data provides a unique opportunity to experiment with the scale of the instruments for a wide range of increases and decreases. It also allows us to calculate with precision and cross-country comparability the net effects of policy changes, taking into account the complex interactions within and between the tax-benefit policies as well as the heterogeneity of population characteristics.

The article is structured as follows. The section on 'The policy instruments' describes the rationale

Table 1. Policy instruments: existing gross levels as a percentage of median equivalent household disposable income 2013.

		Belgium	Bulgaria	Estonia	Greece	Italy	Hungary	United Kingdom
Child benefits	Mean for recipients (%)	19.2	10.7	7.9	6.0	8.6	27.5	24.5
	Households receiving (%)	25.5	7.6	18.5	18.4	12.9	19.2	20.8
Social assistance benefits	Mean for recipients (%)	26.6	12.1	17.1	–	–	21.6	23.2
	Households receiving (%)	1.9	7.1	2.6	–	–	0.3	14.0
Income tax threshold	Threshold level (%)	34.1	–	26.2	52.2	52.0	–	64.3
Median equivalised household disposable income EUR/month		1707	293	550	799	1282	360	1450

Source: Authors' calculations using EUROMOD with EU-SILC.
Household disposable income is equivalised using the modified OECD scale in order to take differences in household composition into account. The scale attributes a weight of 1 to the head of the household, a weight of 0.5 to every person above the age of 14 and a weight of 0.3 to every child aged 0–14. Euro exchange rates: BG 1.956BGN; HU 286.0HUF; UK 0.8553GBP.

for choosing the policy instruments and explains how they are scaled up and down. The section on 'Methodology and data' explains the methodology that is used. The following section presents our estimates of the effect of changes to each of the policy instruments on poverty and compares cost-effectiveness across countries and instruments. The final section concludes by summarising the most important findings and by reflecting on the policy implications of this analysis.

The policy instruments

The instruments we focus on have been chosen on the basis of two criteria. First, they are commonly considered as components of reform strategies to reduce income poverty (or restrain its growth). Thus, we analyse non-contributory benefits that either aim to target the poor or provide universal support rather than contributory benefits which have insurance against risks (e.g. unemployment) as their primary aim. Second, the instruments already exist in most EU countries, and hence are suitable for consideration in a comparative context.

We consider how cost-effectiveness depends on the scale of the instrument by expanding/contracting relevant monetary levels and thresholds by common percentages: 5 percent, 20 percent, 50 percent, 70 percent and 90 percent.[3] We also disentangle the part of poverty change that is related to changes in eligibility (i.e. fewer/more benefit recipients/tax payers) and the part related to changes in benefit/tax threshold levels for those already in receipt/liable.

Child benefits

We expect increasing the scale of child benefits to contribute to reducing poverty among households with children. The extent of the effect depends on the design of the benefit, whether or not benefit entitlements depend on the age and number of children, and how they impact on the particular households with children below the poverty line (Bradshaw, 2006). If the benefit is universal it may appear to be less cost-effective in terms of poverty reduction than a benefit targeted on low income families, but it will have the advantages of high take-up and political support (Levy et al., 2013; Matsaganis et al., 2006; Notten and Gassmann, 2008).

We focus on non-contributory cash benefits specifically targeted at children. Per-child and per-family amounts in universal and means-tested child benefits are adjusted.[4] We also adjust income thresholds in any child benefit means tests, so the number of beneficiaries changes. We do not adjust maternity and parental benefits or child-contingent components of adult out-of-work/in-work or housing benefits, nor support for children channelled through the personal income tax system, which is considerable in Hungary.[5]

For the instruments we consider, Table 1 shows how the average value compares with median equivalised household disposable income and the proportion of all households relying on the instrument (in the case of benefits only) in each country. Child benefits are relatively generous in Hungary, the United Kingdom and to a lesser extent in Belgium. They are much more modest in Greece, Estonia, Italy and Bulgaria. In Bulgaria only a minority of households with children is entitled to such benefits.

Social assistance

Expanding the generosity of cash social assistance schemes is an effective way of increasing the income of existing recipients, and may also draw in more people who have incomes that previously made them ineligible. However, the poverty effect of increasing the social assistance level depends not only on the level relative to the poverty threshold and if conditions of entitlement exclude some people by design (Figari et al., 2013; Van Mechelen and Marchal, 2013) but also on non take-up of the benefits due to stigma, mis-administration or other reasons (Eurofound, 2015).

Table 1 shows that Belgium is the country with the highest average benefit payment and the second lowest prevalence of receipt among the seven. The United Kingdom comes second in terms of average payment and first in terms of prevalence.[6] In Hungary the prevalence is very low and no national cash social assistance benefits were available in Greece and Italy in 2013.[7]

Income tax threshold

Raising the income level at which people become liable for income tax is a way of increasing their disposable income that could in principle take them out of poverty or reduce the poverty gap. However, this depends on the relationship between the tax and poverty thresholds. If the tax threshold is already high there may be few people in poor households who are liable for income tax.

Bulgaria and Hungary are not included in this part of the analysis as they have a flat tax without an income-exemption limit. In Italy, where tax credits operate instead of income exemptions, the amounts of these tax credits are increased/decreased instead. In Greece, in 2013 there was no zero-rate band or equivalent but the system of 2012 (and all the previous ones) included this component. Our simulations first reintroduce that and then explore the effect of amending it.

Table 1 shows that the threshold varies greatly: in Estonia it is half the size of that in Greece, Italy and the United Kingdom.

Rescaling the whole tax-benefit system

To provide a benchmark against which to compare the effects of individual policy instruments, we consider what happens to poverty indicators if all monetary levels and thresholds in the systems of direct taxes and cash benefits are increased/decreased. One might expect comprehensive whole-system changes to be less closely targeted on low income households than some of the individual policy instruments that we consider. The effect depends on the salience of monetary levels, amounts and thresholds in the tax-benefit system and where in the income distribution these thresholds apply.[8] It may therefore differ across countries and our analysis throws some light on this issue.

Methodology and data

Model, data and assumptions

We use the tax-benefit microsimulation model EUROMOD and household micro-data on gross incomes, labour market status and other characteristics of individuals and households. Intuitively, EUROMOD does the following: first, country-specific tax and benefit rules (as at 30 June 2013 in our analysis) are applied to the household data. By doing so, EUROMOD identifies in the data (1) who is entitled to receive a benefit or is liable to pay income taxes or social insurance contributions (SIC) and (2) how much the benefit entitlements and tax or SIC liabilities amount to. Second, a measure of cash household net income is derived based on the sum of the reported gross incomes and the calculated benefit entitlements, net of taxes and SIC.

Using EUROMOD combined with household data is crucial in our analysis for the following reasons: we can simulate the effects of changes to the parameters of policies, by taking into account all resulting changes to both the eligibility/liability and the level of benefit/tax amounts at the individual/household level. In turn, this allows us to decompose the change in the poverty levels – due to changes in the instrument size – by changes in the population coverage versus the benefit/tax level. Furthermore, when changes to a particular instrument are simulated this may affect other benefit entitlements or tax liabilities. These interactions are taken into account as it is the net effect on household income that is relevant. Finally, both the model and the household data have been harmonised across countries to allow for meaningful and consistent cross-country comparisons. EUROMOD has been validated both at the micro and macro level and has been extensively used to address a wide range of economic and social policy research questions (see Sutherland and Figari (2013) and Figari et al. (2015)).

The household data come from the 2010 European Union Statistics on Income and Living Conditions (EU-SILC) for Belgium, Bulgaria, Estonia, Greece, Italy and Hungary. For the United Kingdom, the 2009/2010 Family Resources Survey (FRS) is used. Gross market incomes are updated from the microdata income reference period (2009) to the target period (2013) using appropriate indexes for each income source. Information on income components that cannot be calculated by EUROMOD is taken directly from the data and updated to 2013, along with market incomes.[9] No adjustments are made for economic or demographic changes in the period 2009–2013.

Non-take-up of means-tested benefits is an important phenomenon to account for in evaluating their distributional impact. In the case of non-take-up of social assistance and means-tested child benefits, their poverty effect would be overestimated if full take-up were assumed. In EUROMOD, we make adjustments for benefit non-take-up to social assistance benefits in Belgium and all means-tested benefits and tax credits in the United Kingdom (Leventi and Vujackov, 2016). We assume no change in take-up probability in the case of our simulated reforms and we do not attempt to capture behavioural reactions to policy changes in any dimension.

Finally, the policy scenarios are not revenue-neutral by design, because the point is to measure the budgetary cost. Any financing mechanism would itself have distributional and behavioural effects.

Evaluating the results

We measure effectiveness of the policy instruments according to their impact on income poverty measured using a fixed threshold of 60 percent of the national median household disposable income in 2013. To account for household size and economies of scale within the household, household incomes are equivalised using the modified Organisation for Economic Co-operation and Development (OECD) scale (assigning a value of 1 to the household head, 0.5 to any other adult and 0.3 for each child aged under 14). We use the poverty headcount ratio (i.e. the percentage of the population living below the poverty line) and the normalised poverty gap ratio (i.e. the average poverty gap[10] expressed as a ratio of the poverty line).[11] We calculate standard errors for the results based on the DASP package developed by Araar and Duclos (2007), taking into account sampling variation.

We evaluate the change in poverty in relation to the change in the net budgetary cost to the public finances. We use as an indicator of cost-effectiveness the ratio of the percentage point change in poverty (headcount or gap) to the change in net budgetary cost (spending on cash benefits less revenue from direct taxes and SIC), expressed as a proportion of GDP.

Results

The effects of changes to the three policy instruments on the poverty headcount and gap are discussed policy-by-policy and in relation to their budgetary implications (shown graphically in Figures 1–3), and also relative to rescaling the whole systems (Figure 4). Detailed results for the 5 percent, 20 percent, 50 percent, 70 percent and 90 percent increases/decreases are shown in the online Appendix (Tables A.1, A.2). Table 2 provides an

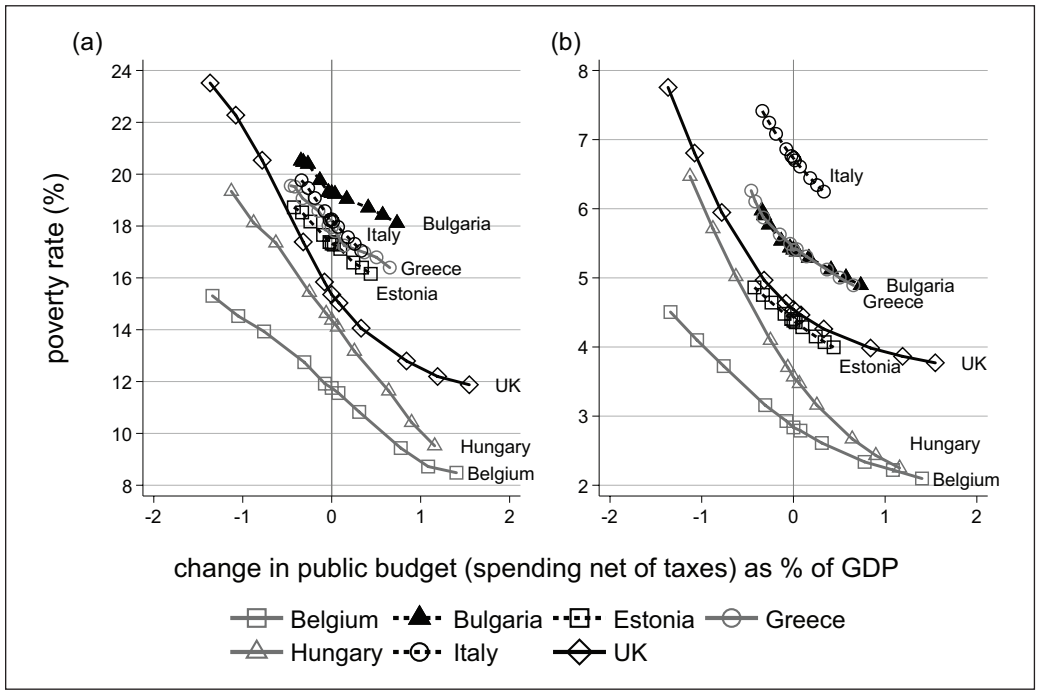

Figure 1. Child benefit levels: poverty versus cost. (a) Poverty headcount. (b) Poverty gap.
Source: Authors' calculations using EUROMOD and EU-SILC.
Reading from left to right, the instruments are decreased by 90 percent, 70 percent, 50 percent, 20 percent and 5 percent and increased by 5 percent, 20 percent, 50 percent, 70 percent and 90 percent. Poverty is measured using a fixed threshold, 60 percent of median equivalised household disposable income under the 2013 baseline policy system. The poverty gap is expressed as a ratio of the poverty line. The change in the public budget is the direct effect of changing the instruments net of any interactions with the rest of the tax-benefit system, as a percentage of 2013 GDP.

assessment of the relative cost-effectiveness of the instruments within and across countries.

Child benefits

As shown in the online Appendix (Tables A.1 and A.2), increasing child benefits by 20 percent has a modest effect on the poverty headcount, lowering it by 1.3 percentage points (pp) in the United Kingdom, 1.2 pp in Hungary and 0.9 pp in Belgium, the countries with the largest child benefit systems but by much less in the other countries. An increase of 90 percent would result in a reduction of the headcount by at least 1 pp in all countries, with large inroads in Hungary (4.8 pp), the United Kingdom (3.5 pp) and Belgium (3.3 pp). The same three countries show the largest effects on the poverty gap.

Figure 1(a) shows that in many countries the effect on the poverty headcount is broadly proportional to the scale of the change in spending on child benefits (measured in terms of percent of GDP), both for increases and decreases: the lines are straight and the effects are symmetrical for increases and decreases. There are some exceptions as well as differences in the gradient of the effects (that is, differences in poverty effectiveness depending on the scale of the benefit). The poverty rate falls fastest for a given increase in child benefit spending in Hungary and rises fastest for a given reduction in spending in the United Kingdom.

These differences can be explained by a number of factors: the density and composition of populations affected by the changes in benefits, the relationship between any income thresholds and the poverty threshold and the nature of the benefit designs. There

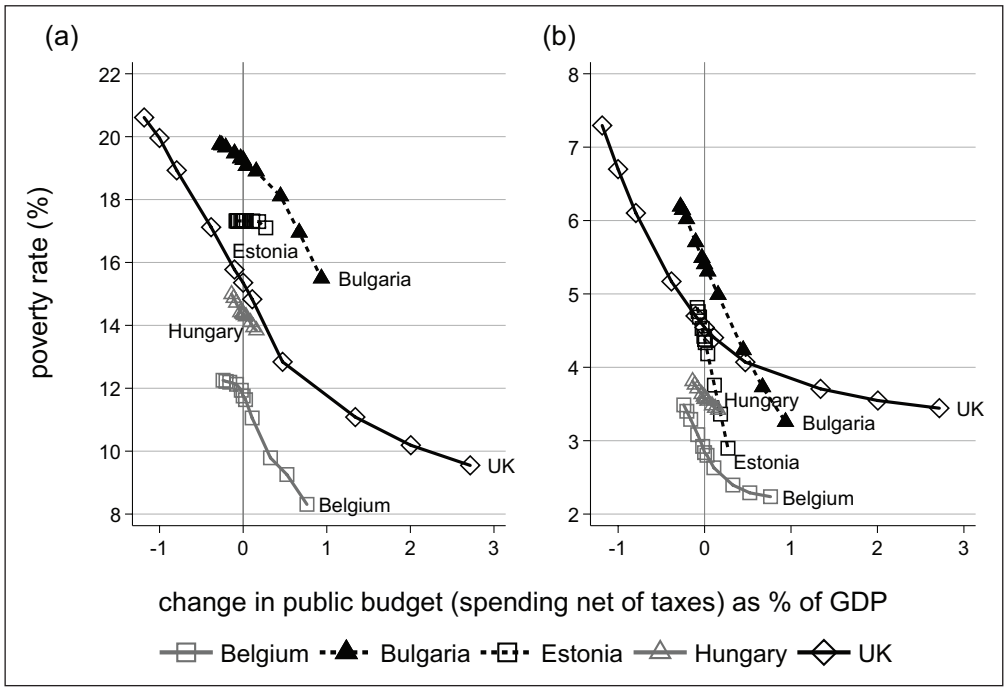

Figure 2. Social assistance minimum income levels: poverty versus cost. (a) Poverty headcount. (b) Poverty gap.
Sources and Notes: see Figure 1. There is no national social assistance benefit in Greece and Italy.

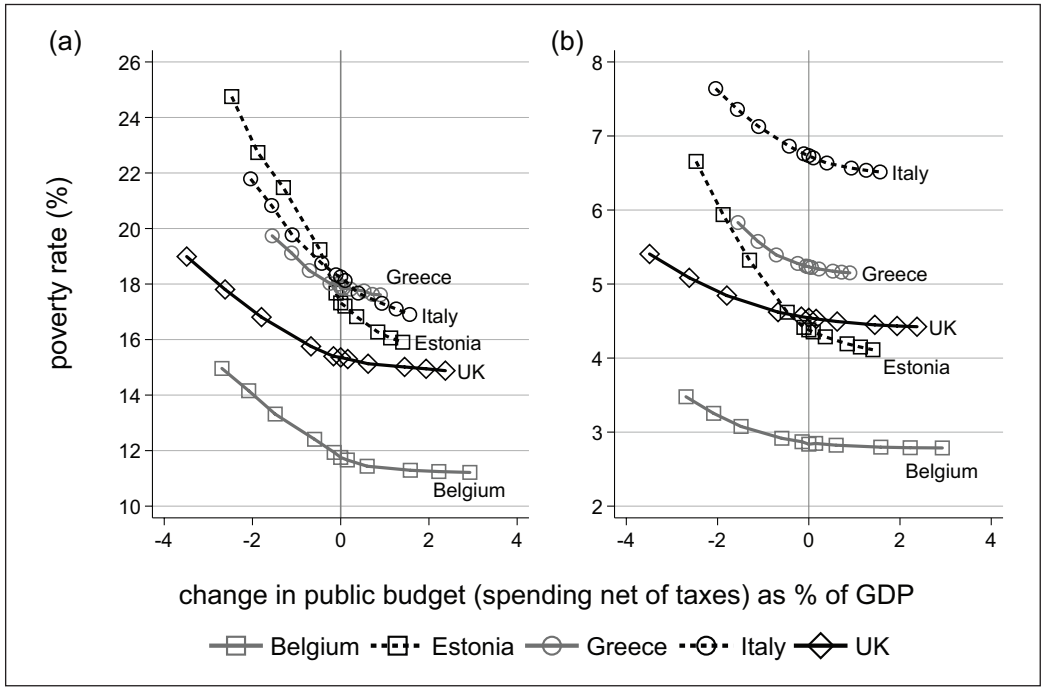

Figure 3. Income tax thresholds: poverty versus cost. (a) Poverty headcount. (b) Poverty gap.
Sources and Notes: see Figure 1. There is no income tax zero rate band in Bulgaria and Hungary.

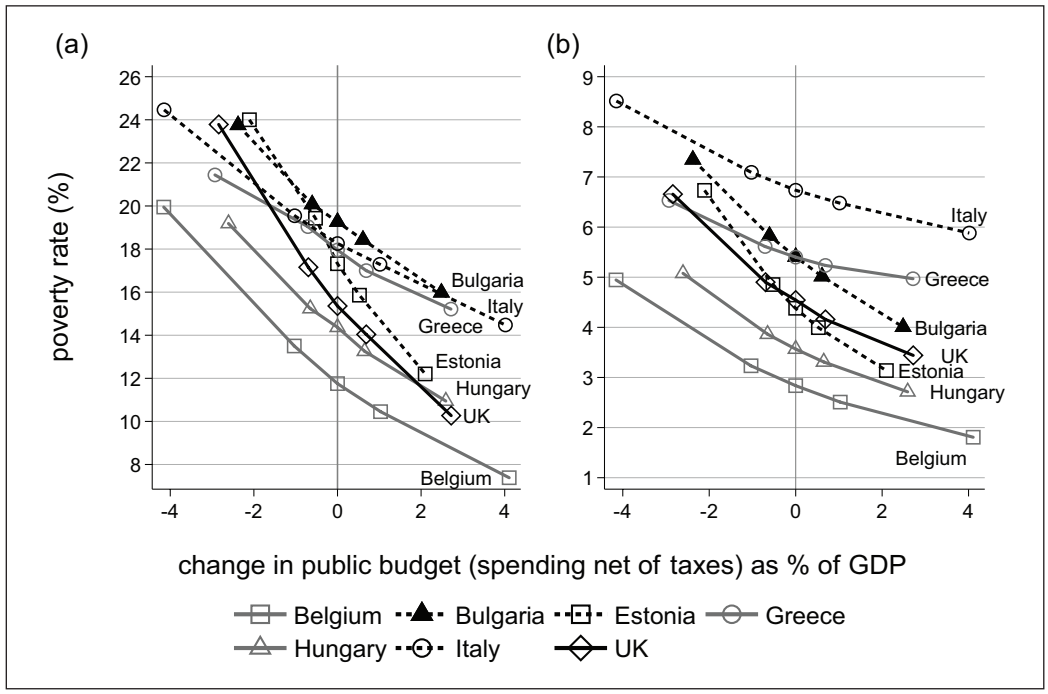

Figure 4. Rescaling the whole system: poverty versus cost. (a) Poverty headcount. (b) Poverty gap.
Sources and Notes: see Figure 1. Here the system is decreased and increased by 5 percent and 20 percent.

are some interactions with other parts of the tax-benefit system: in Hungary elements of the child benefit are taxable and in Bulgaria, Estonia and Hungary they are included in the assessment for social assistance entitlement and for housing benefit in the United Kingdom. But these do not seem to play a major role in explaining the differences in patterns of cost-effectiveness, since in many cases they affect both the budgetary effect and the income position of the household relative to the poverty threshold.

For example, the United Kingdom is distinguished by a generous means-tested child benefit, on top of a child benefit that is not means-tested except at high incomes. Together, they bring many families from below to above the poverty threshold and further expanding them is not only increasingly less cost-effective because fewer recipients are poor, but also costs increase due to extension of coverage of the means-tested component as well as the level of both benefits for existing recipients. Reductions in size have a proportionately large adverse effect on poverty because many benefit recipients are brought from above to below the poverty threshold in part due to reductions in coverage. A similar reduction in cost-effectiveness is observed in Belgium for high levels of expansion, because of increasing proportions of recipients of the mainly non-means-tested benefit having crossed above the poverty threshold. Stronger effects in the other direction, as in the United Kingdom, are not observed as coverage effects are minimal in the mainly universal Belgian child benefit system. In Hungary, the other country with large child benefits, mostly universal, cost-effectiveness is broadly unrelated to scale.

In the case of Bulgaria, the reduction in spending is smaller for larger reductions in child benefits, that is, the rate of return is decreasing. This is mostly due to the population composition; there are fewer families with very low incomes (between 10% and 30% of the value of the child benefit income-test) than with low incomes (between 30% and 50% of the value of the child benefit income-test). It is also due to the interaction between child benefits and social assistance; spending on social assistance benefits

Table 2. Poverty–cost ratio by policy instrument.

	Child benefit		Social assistance		Income tax threshold		Whole tax-benefit system	
	Poverty headcount							
	−20%	+20%	−20%	+20%	−20%	+20%	−20%	+20%
Belgium	3.23	2.99	**4.68**	**6.48**	1.11	0.53	1.97	1.06
Bulgaria	3.76	1.31	2.04	2.32	—	—	1.89	1.32
Estonia	3.49	2.09	0.00	0.00	**4.05**	**1.37**	**3.17**	**2.44**
Greece	4.20	**4.99**	—	—	0.64	0.25	1.19	1.32
Hungary	4.28	**4.70**	1.33	2.51	—	—	1.85	1.32
Italy	4.08	4.08	—	—	1.14	**1.47**	1.50	0.94
United Kingdom	**6.34**	3.93	**4.61**	5.34	0.59	0.37	**2.97**	**1.87**
	Poverty gap							
	−20%	+20%	−20%	+20%	−20%	+20%	−20%	+20%
Belgium	0.98	0.80	2.83	2.11	0.10	0.06	0.51	0.25
Bulgaria	0.97	0.70	2.91	2.68	—	—	**0.82**	**0.56**
Estonia	1.03	0.97	**5.27**	**5.35**	**0.50**	**0.26**	**1.11**	**0.59**
Greece	1.16	1.02	—	—	0.19	0.13	0.39	0.16
Hungary	**2.03**	**1.68**	1.36	1.29	—	—	0.58	0.33
Italy	1.32	**2.11**	—	—	0.24	**0.32**	0.42	0.22
United Kingdom	**1.32**	0.86	1.63	1.01	0.11	0.08	0.76	0.39

Source: Authors' calculations using EUROMOD and EU-SILC.
The poverty-cost indicator is calculated as the ratio of the change in poverty headcount or gap (using a fixed poverty threshold) to the change in public budget measured as a percentage of GDP, using the −20% and the +20% change in policy for child benefit, social assistance, income tax and whole system rescaling (the gradient of the curves in, Figures 1–4). The countries with the highest poverty–cost ratio for each scenario for a particular policy instrument (i.e. within columns) are indicated in **bold** (two countries for the policy instruments applying in all seven cases, one country for the other instruments). The most cost-effective policy instrument within countries for each scenario is shown underlined.

increases when scaling down child benefits but income levels on social assistance are too low for there to be an effect on the poverty headcount.

Figure 1(b) shows the relationship between child benefit spending and the poverty gap, which is still linear for the four countries with smaller child benefits, with Estonia showing somewhat lower poverty effectiveness (smaller gradient) than Bulgaria, Greece or Italy. This suggests that the relatively small benefits are important for reducing the poverty gap, but even the 90 percent increase does not succeed in lifting many households above the poverty threshold. The relationships are not linear in Belgium, Hungary or the United Kingdom with higher poverty gap reduction effectiveness at lower levels of spending. This can be explained by larger benefits lifting households above the poverty threshold, where they no longer contribute to the poverty gap. This flattening of the curve at higher spending levels is particularly evident for the United Kingdom where increasing child benefits by 90 percent would imply a poverty gap reduction of less than one-fifth, whereas reducing benefits by 90 percent would imply an increase in poverty gap of 70 percent. For these three countries over the whole range, poverty gap effectiveness is the highest in Hungary and the lowest in Belgium, except for very large increases where it is lower in the United Kingdom.

Social assistance

Figure 2 shows equivalent results for changing social assistance benefit levels. There are some aspects that are in marked contrast to the effects of changing child benefits. First, the scale of the existing systems and hence the effects of proportional expansion/contraction on budgetary cost vary differently across countries. In contrast with its relatively large child

benefit payments, Hungary has a very small social assistance scheme. The United Kingdom is the country with the costliest proportional expansion, because it starts with relatively high payments and high coverage.

Second, the relationship between the poverty effects of benefit decreases and increases is different. Typically, increasing social assistance levels not only increases the income of current recipients but extends entitlement to those with a higher income. Our methodology enables us to disentangle the part of poverty change which is related to changes in eligibility (i.e. fewer/more benefit recipients) and the part related to changes in benefit levels for those already in receipt (online Appendix Table A.3). We find that indeed changes in the poverty headcount, as a result of scaling up/down the policy in Belgium, Bulgaria, Hungary and United Kingdom are driven by both changes in the benefit levels and in coverage (although we should note that in Belgium, Bulgaria and Hungary we rarely see large total poverty changes). We draw the same conclusion for the changes in the poverty gap in all five countries considered, including Estonia (online Appendix Table A.4).

Depending on the composition of the relevant sections of the income distribution, the budgetary cost of increases could be higher than the budgetary savings from equivalent decreases. Figure 2(a) and (b) depicts this in all five systems with the strongest cases being Estonia and Belgium. In Belgium and Bulgaria the effect on the poverty headcount of reducing social assistance is small, whereas the increase in poverty gap is relatively large, consistent with the finding of Tasseva (2016) for Bulgaria that most social assistance recipients are among those with incomes far below the poverty threshold. When scaling down social assistance, we again see a decreasing rate of return of spending, that is, for larger decreases in social assistance benefit levels the reduction in total spending is smaller, due to small numbers of beneficiaries on very low incomes.

In contrast, in the United Kingdom reducing social assistance has a substantial effect on the poverty headcount (cutting it by 90% results in a 4 pp increase), consistent with some existing recipients having incomes above the poverty threshold. Reductions add to the poverty rate and make budgetary savings even when comparing the 70 percent with the 90 percent reduction scenario. This is because some social assistance entitlements take account of extra costs, such as for disability and may bring recipient incomes a long way above the poverty threshold in the baseline.

In Estonia, the poverty headcount effect of expanding/contracting social assistance is very small and indeed there is no effect except for a 90 percent expansion (see online Appendix Table A.1). However, the effect on the poverty gap is dramatic, for a relatively small increase in GDP. This is consistent with the Estonian social assistance payments being very low relative to the poverty threshold. Even almost doubling them reduces the poverty gap by 1.5 pp: more than in any of the other countries and at a much lower cost (see the gradient in Figure 2(b)). Otherwise the poverty headcount–cost gradients for benefit increases across countries are rather similar to each other but the poverty gap gradients vary more across countries with the effects being largest in Bulgaria (after Estonia) and smallest in Hungary. As with child benefits, in Belgium and the United Kingdom the poverty gap effectiveness of social assistance reduces with the size of the benefit, as larger shares of recipients are lifted above the poverty threshold.

Income tax threshold

The effects of increasing the income tax threshold on either poverty measure (see Figure 3) are very small, although the budgetary cost is large. For example, spending 1 percent of GDP in this way (and interpolating linearly where relevant) would reduce the poverty headcount by less than 1 pp in all countries except Estonia (where the reduction is a little more). Most people paying income tax, benefitting from this policy change, are in households with income above the poverty threshold. However, the effects are not linear and the gradients are higher for smaller threshold increases, suggesting that there is scope for modest increases to reduce poverty (but at high cost relative to other strategies). There is a similar picture for the poverty gap.

The situation is quite different when reducing the tax threshold. This has an effect on increasing poverty. The extra tax paid increases the numbers below

the poverty threshold (online Appendix Table A.4) and the size of the poverty gap, with the gradient being noticeably steeper in Estonia than in the other four countries. Reducing the tax-free income allowance by 90 percent would increase the poverty headcount by 7.4 pp. This near-abolition scenario would increase the poverty rate in the remaining countries by between 2 pp (Greece) and 4 pp (Italy and the United Kingdom).

Rescaling the whole tax-benefit system

To provide a benchmark for the individual policy instruments that we consider, Figure 4 shows the poverty cost-effectiveness of contracting/expanding the whole system by between −20 percent and +20 percent. It is notable that neither the budgetary cost of expansion nor the budgetary gain from contraction are the same size in GDP terms across countries, reflecting both differences in overall size of the systems and in the importance of monetary levels and thresholds in the systems. The cost effects are largest in Belgium and Italy (due at least in part to their large pension systems) and smallest in Estonia. The poverty cost-effectiveness also differs across countries with the largest poverty effects (in terms of both headcount and gap) per budgetary unit in Estonia and the United Kingdom and the smallest in Greece.

Comparisons across policy instruments

A comparison of the poverty effectiveness of the particular policy instruments is summarised in Table 2 by showing the poverty–cost ratios (gradients) evaluated for the ±20 percent scenarios for the three instruments as well as the benchmark case of the whole tax-benefit system. For increases in the instruments, the higher the ratio the greater the poverty reduction for a given increase in spending (i.e. cost-effectiveness). For reductions in the instruments, the higher the ratio the larger the poverty increase for a given budgetary gain.

Comparing within columns and between countries shows that increasing child benefits is most effective at reducing the headcount in Greece and Hungary and the gap in Italy and Hungary (numbers highlighted in bold). Reducing child benefits increases the headcount most for a given budgetary saving in the United Kingdom and the gap most in Hungary. Social assistance increases are most cost-effective for the headcount in Belgium and reductions cause the highest poverty increase for a given budgetary saving in Belgium as well as the United Kingdom. In Estonia, changes in either direction have no effect on the headcount but are the most cost-effective at reducing the poverty gap. Changing income-tax thresholds has the largest effects given costs in Estonia, for both the headcount and the gap. Increasing income tax thresholds is also cost-effective in reducing the poverty headcount and gap in Italy. Inflating the whole system is most cost-effective in Estonia and the United Kingdom (for the headcount) and Estonia and Bulgaria (for the gap). The reverse also applies: reducing all monetary levels has the most poverty-increasing effect given the budgetary gain in the same countries.

Comparing within countries (that is, across rows in Table 2) and focusing first on the poverty headcount, increasing social assistance is the most cost-effective option of the four considered in Belgium, the United Kingdom and Bulgaria (numbers underlined), and there are other policy instrument reductions that have a more damaging effect on poverty in all countries apart from Belgium. This is perhaps surprising, given its targeted nature. Child benefit increases are most cost-effective, compared to other policies, in reducing poverty in Greece and Italy, which do not have social assistance, and Hungary. In these three countries and in Bulgaria and especially the United Kingdom, these are the most damaging to reduce for given budgetary saving, of the instruments considered. In Bulgaria and the United Kingdom, this may be related to the partial income targeting of child benefits. In contrast, social assistance is the best performing instrument in poverty gap reduction effectiveness, as well as being the most damaging to reduce, in all countries with such an instrument with the exception of Hungary where social assistance is small. In Estonia the highest poverty headcount increase from a reduction in policy instrument arises with the income tax threshold and the most cost-effective change to reduce the poverty headcount is not any of the individual instruments but instead whole system expansion. This suggests that the policies that are mostly responsible for

poverty reduction in this country are pensions and contributory (i.e. maternity, parental and unemployment) benefits.

Conclusion

Our analysis provides evidence on the relative effectiveness of different types of policy instruments in reducing the risk of poverty, or limiting its increase, by measuring the implications of increasing or reducing the scale of the instrument within its national context.

The assessment of the most cost-effective instrument depends on whether the poverty headcount or poverty gap is used as the outcome indicator and on the direction and scale of the change in some instruments and countries and not others. Nevertheless, our results show that the most preferred options in terms of poverty reduction cost-effectiveness are child benefits and social assistance. Based on the poverty headcount, increasing social assistance is the most cost-effective approach of those considered in Belgium and the United Kingdom. Child benefit increases are the most effective option considered in Greece, Hungary and Italy. In Estonia the benchmark case of rescaling all monetary components is actually more cost-effective than any of the single options.

It is important to look at the poverty gap as well as the poverty headcount in evaluating cost-effectiveness. The effect of social assistance in Estonia provides a good illustration. As the 2013 level of social assistance is very low relative to the poverty threshold, its increase makes no difference to the headcount unless it is scaled up to be almost double its current value but scores very highly in terms of cost-effectiveness when the effect on the poverty gap is measured.

The effects are not always linear nor are they always symmetrical for increases and decreases in the instruments. For example, increasing income tax thresholds has little effect on poverty but lowering them would have a larger negative effect. Nevertheless, except in Estonia, this negative effect is smaller for a given budgetary gain than would occur if any of the other instruments were reduced in size. This suggests that a revenue-neutral combination of reduction to the tax threshold and increase in child benefit could be a promising path for policy makers interested in cost-effective poverty reduction. On the other hand, reducing child benefits is a particularly damaging way to make budgetary cuts, given the implications for the increase in the poverty headcount. This applies in countries with both high and low average child benefit payments and high and low benefit prevalence.

More generally, our approach to measuring the poverty reducing effectiveness of single policy instruments can inform the design of policy packages, combining changes to more than one instrument. For example, similar analysis of the implications for poverty of increasing the minimum wage level (Leventi et al., 2017) shows that this is not well targeted on people in households with income below the poverty threshold and is therefore a policy approach that will not achieve poverty reduction on its own. Nevertheless, minimum wages reduce the need for in-work benefits and help to make work pay (Immervoll and Pearson, 2009) and are therefore suitable for combining with increases in social assistance into a package that reduces poverty while minimising damage to incentives to work (Collado et al., 2016).

The limitations of our approach relate to the choice of policy instruments that are compared. First, in countries without one of the policy instruments as part of its system, the relative effectiveness of the remaining instruments is enhanced. For example, if Greece had a minimum income social assistance scheme in place, then its child benefits might look less effective than they do in its absence. Second, the instruments analysed were chosen partly because they exist in many of the seven countries. There are other less common instruments that are relevant in particular national contexts, such as in-work benefits, targeted tax credits and housing benefits. As the Estonian case suggests, the most cost-effective poverty-reducing instrument may not be one of those analysed here. In a single country context, it would be possible to test all relevant policy instruments using our approach. Comparing across countries, we have demonstrated how, using microsimulation techniques, we can take account of the national diversity in existing policy systems,

population characteristics and economic circumstances at a common point in time to assess the relative poverty-reducing cost-effectiveness of policies with similar goals.

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Notes

1. This is closely related to measures of target efficiency developed by Beckerman (1979).
2. See Eurostat (2017a), indicator spr_exp_sum.
3. We choose not to show the effects of abolishing instruments entirely because in some policy systems receipt of a particular benefit acts as a passport to entitlement to other benefits or as an alternative to receipt of other benefits. Invoking these effects would distract from our focus on the effectiveness of particular instruments.
4. The benefits that are adjusted here are as follows: *Belgium*, non-means-tested child allowance, means-tested child allowance; *Bulgaria*: means-tested child benefit, non-means-tested birth grant, non-means-tested child benefit for mothers in tertiary education, means-tested child benefit for education, non-means-tested benefit for twins; *Estonia*: child allowance, childcare allowance, parental allowance for families with 7+ children, childbirth allowance, foster care allowance (all non-means-tested); *Greece*: child benefit, large family benefit (both means-tested); *Italy*: means-tested family allowances for lone parents, two parents and for families with at least three children; *Hungary*: non-means-tested family allowance, means-tested regular child protection benefit, non-means-tested maternity grant, non-means-tested child raising support, non-means-tested child care allowance; *UK*: means-tested child tax credit, non-means-tested child benefit.
5. Figari et al. (2011) analyse the impact of the whole package of child contingent incomes.
6. The specific benefits that are included are: *Belgium*: income support, *Bulgaria*: guaranteed minimum income, heating allowance; *Estonia*: subsistence benefit, means-tested subsistence benefit for families; *Hungary*: social assistance (regular benefit and stand-by allowance); *UK*: income support, income-based jobseeker's allowance, pension credit. All benefits are means-tested.
7. See World Bank (2015) and Ravagli (2015), respectively, for analysis of the effects of potential schemes in these two countries.
8. For related analysis on the United Kingdom, see Sutherland et al. (2008) and on the same seven countries, Hills et al. (2014).
9. Non-simulated components are typically contributory pensions and maternity benefits and disability benefits. They are not simulated because of insufficient information in the household micro-data about work history or disability status to calculate eligibility or size of entitlement.
10. The poverty gap is the mean shortfall of the total population from the poverty line (counting the non-poor as having zero shortfall), expressed as a percentage of the poverty line.
11. These indicators correspond to FGT0 and FGT1 from Foster et al. (1984).

References

Adema, W., Gray, D. and Kahl, S. (2003) 'Social Assistance in Germany', *OECD Labour Market and Social Policy* Occasional Papers no. 58. Paris: OECD.

Araar, A. and Duclos, Y.J. (2007) *DASP: Distributive Analysis Stata Package*. Québec: PEP, World Bank, UNDP and Université Laval.

Atkinson, A.B. (2009) 'Stress-Testing the Welfare State', in B. Ofstad, O. Bjerkholt, K. Skrede and A. Hylland (eds) *Rettferd og politikk: festskrift til Hilde Bojer på 70- årsdagen* [Justice and Politics: Festschrift for Hilde Bojer on her 70th birthday]. Oslo: Emiliar Forlag, 31–39.

Avram, S., Figari, F., Leventi, C., Levy, H., Navicke, J., Matsaganis, M., et al. (2013) 'The Distributional

Effects of Fiscal Consolidation in Nine EU Countries', *EUROMOD Working Paper no. EM2/13*. Colchester: ISER, University of Essex.

Bargain, O., Immervoll, H. and Viitamaki, H. (2007) 'How Tight Are Safety Nets in Nordic Countries? Evidence from Finnish Register Data', *IZA* Discussion Papers no. 3004. Bonn: IZA.

Beckerman, W. (1979) 'The Impact of Income Maintenance Payments on Poverty in Britain, 1975', *Economic Journal* 89(354): 261–79.

Bradshaw, J. (2006) 'Child Benefit Packages in 15 Countries in 2004', in J. Lewis (ed.) *Children, Changing Families and Welfare States*, pp. 69–89. Cheltenham: Edward Elgar.

Collado, D., Cantillon, B., Van den Bosch, K., Goedemé, T. and Vandelannoote, D. (2016) 'The End of Cheap Talk about Poverty Reduction: The Cost of Closing the Poverty Gap While Maintaining Work Incentives', *ImPRovE Working Paper no. 16/08*. Antwerp: Herman Deleeck Centre for Social Policy, University of Antwerp.

Eurofound (2015) *Access to Social Benefits: Reducing Non-Take-Up*. Luxembourg: Publications Office of the European Union.

Eurostat (2017a) *Online Statistics Database*. Luxemburg: Eurostat. Available at http://ec.europa.eu/eurostat/data/database (accessed December 2017).

Eurostat (2017b) *Smarter, Greener, More Inclusive – Indicators to Support the Europe 2020 Strategy*. Luxembourg City: Publications Office of the European Union.

Figari, F., Matsaganis, M. and Sutherland, H. (2013) 'Are European Social Safety Nets Tight Enough? Coverage and Adequacy of Minimum Income Schemes in 14 EU Countries', *International Journal of Social Welfare* 22: 3–14.

Figari, F., Paulus, A. and Sutherland, H. (2011) 'Measuring the Size and Impact of Public Cash Support for Children in Cross-National Perspective', *Social Science Computer Review* 29(1): 85–102.

Figari, F., Paulus, A. and Sutherland, H. (2015) 'Microsimulation and Policy Analysis', in A. Atkinson and F. Bourguignon (eds) *Handbook of Income Distribution*, vol. 2B, pp. 2141–221. Amsterdam: Elsevier.

Foster, J., Greer, J. and Thorbecke, E. (1984) 'A Class of Decomposable Poverty Measures', *Econometrica* 52(3): 761–6.

Hills, J., Paulus, A., Sutherland, H. and Tasseva, I. (2014) 'A Lost Decade? Decomposing the Effect of 2001–11 Tax-Benefit Policy Changes on the Income Distribution in EU Countries', *ImPRovE Working Paper no. 14/03*. Antwerp: Herman Deleeck Centre for Social Policy, University of Antwerp.

Immervoll, H. and Pearson, M. (2009) 'A Good Time for Making Work Pay? Taking Stock of In-Work Benefits and Related Measures across the OECD', *OECD Social, Employment and Migration Working Papers no. 81*. Paris: OECD.

Leventi, C. and Vujackov, S. (2016) 'Baseline Results from the EU28 EUROMOD (2011–2015)', *EUROMOD Working Paper no. EM3/16*. Colchester: ISER, University of Essex.

Leventi, C., Sutherland, H. and Tasseva, I. (2017) 'Improving Poverty Reduction in Europe: What Works Best Where?*' EUROMOD Working Paper no. EM8/17*. Colchester: ISER, University of Essex.

Levy, H., Lietz, C. and Sutherland, H. (2007) 'Swapping Policies: Alternative Tax-Benefit Strategies to Support Children in Austria, Spain and the UK', *Journal of Social Policy* 36(4): 625–47.

Levy, H., Matsaganis, M. and Sutherland, H. (2013) 'The Distributive and Cross Country Effects of a Child Basic Income for the European Union', *International Journal of Microsimulation* 6(1): 63–85.

Levy, H., Morawski, L. and Myck, M. (2009) 'Alternative Tax-Benefit Strategies to Support Children in Poland', in O. Lelkes and H. Sutherland (eds) *Tax and Benefit Policies in the Enlarged Europe: Assessing the Impact with Microsimulation Models* (European Centre Vienna), pp. 125–52. Farnham: Ashgate.

Matsaganis, M., O'Donoghue, C., Levy, H., Coromaldi, M., Mercader-Prats, M., Rodrigues, C.F., et al. (2006) 'Reforming Family Transfers in Southern Europe: Is There a Role for Universal Child Benefits?' *Social Policy and Society* 5(2): 189–97.

Mood, C. (2006) 'Take-Up Down Under: Hits and Misses of Means-Tested Benefits in Australia', *European Sociological Review* 22(4): 443–58.

Notten, G. and Gassmann, F. (2008) 'Size Matters: Targeting Efficiency and Poverty Reduction Effects of Means-Tested and Universal Child Benefits in Russia', *Journal of European Social Policy* 18(3): 260–74.

Popova, D. (2016) 'Distributional Impacts of Cash Allowances for Children: A Microsimulation Analysis for Russia and Europe', *Journal of European Social Policy* 26(3): 248–67.

Ravagli, L. (2015) 'A Minimum Income in Italy', *EUROMOD Working Paper no. EM16/15*. Colchester: ISER, University of Essex.

Salanauskaite, L. and Verbist, G. (2013) 'Is the Neighbour's Grass Greener? Comparing Family

Support in Lithuania and Four Other New Member States', *Journal of European Social Policy* 23(3): 315–31.

Sutherland, H. and Figari, F. (2013) 'EUROMOD: The European Union Tax-Benefit Microsimulation Model', *International Journal of Microsimulation* 6(1): 4–26.

Sutherland, H., Hancock, R., Hills, J. and Zantomio, F. (2008) 'Keeping Up or Falling Behind? The Impact of Benefit and Tax Uprating on Incomes and Poverty', *Fiscal Studies* 29(4): 467–98.

Tasseva, I.V. (2016) 'Evaluating the Performance of Means-Tested Benefits in Bulgaria', *Journal of Comparative Economics* 44(4): 919–35.

Van Mechelen, N. and Marchal, S. (2013) 'Trends and Convergence of Europe's Minimum Income Schemes', *ImPRovE* Discussion Paper no. 13/11. Antwerp: Herman Deleeck Centre for Social Policy, University of Antwerp.

World Bank (2015) *Ex Ante Poverty and Fiscal Evaluation of a Guaranteed Minimum Income Programme in Greece*. Washington, DC: World Bank Group.