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Antipoverty effects of various social transfers and income taxes across countries

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Abstract

Most welfare states design their tax/benefit-system to combat income poverty. This paper analyzes the effectiveness of social transfers and income taxes in alleviating poverty. We use micro-data from the Luxembourg Income Study (LIS) to examine the antipoverty effect of social transfers and income taxes. Our data also allow us to decompose the trajectory of the market income poverty to disposable income poverty into 7 different benefits, income taxes and social contributions.

On average across 49 countries, 15 percent of the total population is lifted out of poverty via tax/benefit-systems. As far as specific social programs are concerned, only three programs account for the bulk of total poverty reduction: old-age/disability/survivor scheme (81%), social programs for family and children (14%) and the unemployment scheme (8%).

Key words: welfare states, social income transfers, income poverty, LIS
JEL-codes: H53, H55, and I32

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1. Introduction

High and middle income countries spend a large share of their budget on income maintenance, but poverty has not been eradicated. A sizable proportion of the population lives in poverty in all welfare states. According to the most common standards used in international poverty analyses, on average roughly 11.5 percent of population live in relative poverty in OECD countries (OECD, 2015; 2016). The European Union especially encourages Member States to combat poverty as part of the Lisbon Agenda and the strategy Europe 2020 (European Commission, 2010). In the European Union people are said to be at risk of income poverty if their incomes are below 60 per cent of the median disposable income of households in their country, after adjusting for household size (equivalence scales). Based on this EU-agreed definition, the proportion of the population of the EU that is at risk of poverty in 2017 is 17 per cent. This means that around 85 million citizens are considered as being at risk of poverty; one fifth are children and 15 percent are elderly. In OECD studies, the poverty rate is often defined as the proportion of individuals with equivalized disposable income less than 50 per cent of the median income.

Poverty is a multidimensional problem (Kakwani and Silber, 2007; 2008) and there are several ways to combat poverty, but income transfers are certainly important instruments. A vast literature claims that high social effort goes along with low poverty levels across countries. Several quantitative studies indicate that there is strong negative correlation between poverty and social expenditures across European countries over the last 25 years. For example, Smeeding (2005: 974) claims that higher levels of government spending as in Scandinavia and Northern Europe and more careful targeting of government transfers on the poor as in Canada, Sweden and Finland, produce lower poverty rates. Noland and Marx (2009: 329–330) state that 'there is a strong relationship at country level between the level of social spending and the incidence of poverty' … arguably one of the most robust findings in comparative poverty research'. Cantillon and Vandenbroucke (2014) emphasize the role of income redistribution for alleviating poverty.

This paper is focused on one important dimension of poverty: income poverty. We examine the antipoverty effects of several social transfers and income taxation (including social contributions) to households. The paper mainly has an exploratory character. Our analysis of the level and of income poverty and the antipoverty effects of tax/benefit (T/B)-systems is based on data of the Luxembourg Income Study (LIS 2019) on income in a standardized way across countries and over time. We use the budget incidence approach—despite some methodological problems we will address— to study the combined effects of social transfers and income taxes in reducing income poverty. There are many possible ways to analyze the impact of social

transfers and income taxes on the distribution of income and poverty.[1] It is generally agreed upon that there is no single 'correct' methodology. Nonetheless, the budget incidence approach is - still - a standard methodology for studying the combined effects of all taxes and transfers on poverty and inequality. Some recent studies have examined the role of income transfers and taxes in reducing income inequality, using this methodology (OECD, 2015; Jesuit and Mahler, 2017 and Caminada *et al*., 2019a and 2019b).[2]

In this paper, we undertake a detailed simulation approach which allows us to decompose (the change in) relative income poverty through income taxes and several social transfers. We provide evidence on levels of poverty and the poverty reducing effect of welfare states by several social transfers and income taxes across countries. To that end, we construct a user-friendly dataset (Caminada and Wang, 2019). This dataset covers a larger number of countries (49) using the latest LIS data available.

The paper is organized as follows. In Section 2 we discuss the theoretical background of redistribution and poverty alleviation in welfare states and summarize empirical literature on the poverty reducing effect of social transfers across countries. Section 3 presents our research method and data. Section 4 analyzes relative income poverty and poverty alleviation via T/B-systems across 49 countries around 2013 and presents a detailed decomposition of the antipoverty effect of several social transfers and income taxes across countries. In Section 5 we discuss the methodology and the dataset used and perform a sensitivity analysis with three different data sources. Section 6 concludes the paper.

2. Relative income poverty and the antipoverty effects of social transfers and income taxes across countries

2.1 Poverty reduction and income redistribution in the welfare state

Poverty relief and income redistribution are important objectives of the welfare state (Barr, 1992). No individual or household should fall below a certain income level: the poverty line. This poverty line is a normative concept. There are three common ways of setting the poverty line: an absolute standard, a relative standard and a subjective standard. The US poverty threshold is based on an absolute poverty standard, which remains fixed over time in real terms. The EU-agreed relative poverty line is set as a fixed percentage of the median income in each country, which may change over time if median income changes in real terms. The subjective

[1] Among others Atkinson (1987), Champernowne (1974), Hagenaars and De Vos (1987). See for an overview Alvaredo and Gasparini (2015) and Caminada *et al.* (2019c).

[2] OECD (2015) was the third OECD flagship publication on trends, causes and remedies to growing inequalities. The 2008 report Growing Unequal? documented and analyzed the key features and patterns of trends in income inequality in OECD countries. The 2011 publication Divided We Stand: Why Inequality Keeps Rising analyzed the deep-rooted reasons for rising inequality in advanced and most emerging economies. The 2015 publication It Together: Why Less Inequality Benefits All highlights the key areas where inequalities originate and where new policy approaches are required.

poverty line is based on respondents' answers to questions regarding what they consider to be an adequate standard of living. In this paper a relative poverty line is used, following the EU and the OECD. Essentially, a relative poverty statistic is an income inequality indicator.

In welfare states social income transfers and income taxes redistribute income from rich to poor, but there is vast empirical evidence that social benefits have larger redistributive effects than income taxes in most countries (Caminada *et al*., 2019a and 2019b; Jesuit and Mahler, 2017). When evaluating the redistributive power of various social transfers, important factors to consider are the program design and the scale and scope of social transfer schemes (Barr, 1992; Goudswaard and Caminada, 2010). The most redistributive programs comprise means-tested benefits financed out of progressive social contributions or income taxes. A means-tested program with social benefits provided only to the poorest involves more redistribution for a given amount of spending than a universal program. Social assistance and family programs often have these kind of characteristics. The next most redistributive are programs with flat-rate benefits, financed out of income-related social contributions or general taxation. Public old-age pension programs often have such a design. The least redistributive are programs with earnings-related social benefits and proportional contributions. This is the case for most social insurance programs, such as unemployment and disability schemes. However, earnings-related programs may also involve redistribution form rich to poor, because of design features such as thresholds for contributions and ceilings for social benefits.

Obviously, next to the program design, the budget size of programs is important for their redistributive impact. A means-tested program which has a highly redistributive formula has little redistributive impact if expenditure is small. Consequently, it is important to consider both the program budget size of benefit schemes and the extent to which they are targeted toward lower income groups (Korpi and Palme, 1998).

To conclude, it can be expected that universal programs with flat-rate benefits and a big budget size, such as public pension programs, will have a strong redistributive and antipoverty effect. Means-tested programs, such as many social assistance and family schemes, will have the strongest redistributive impact for a given amount of spending, but in most countries their budget is relatively small, compared to universal programs (Caminada *et al*., 2019a). The design of earnings-related social insurance schemes is not primarily directed at redistribution, but these schemes may have a quite large budget size and may thus also involve some redistribution from rich to poor.

2.2 Empirical studies

Many studies analyze the impact of social transfers and taxes on poverty outcomes and inequality. However, the relationship between income inequality, redistribution and poverty in

a cross-country perspective is not crystal clear, mainly because of differences in measurement strategies (see on this Lambert *et al.*, 2010). Indeed, with three distributions involved (pre-tax-transfer income, post-tax-transfer income, and the tax/benefit-system), and with different measurers for poverty and inequality to sum up these distributions, not surprisingly the literature offers a plethora of research methods and empirical results. Below we shall briefly review the main ones.

A first strand of research is – like our study - focused on measuring the direct effect of social transfers and taxes on poverty outcomes, by comparing pre-tax/transfer poverty rates with post-tax/transfer poverty rates. An important study by the OECD (2008: 139-141) concludes that cash benefits and household taxes significantly reduce poverty in all OECD countries. But there are large differences across countries. The percentage difference in poverty reduction ranges from 12 percent in Korea to almost 80 in Sweden, Czech Republic and Denmark. The average poverty reducing effect is little over 60 percent. Countries with higher market-income poverty are not necessarily those with higher disposable-income poverty. Causa and Hermansen (2017) show that in most OECD countries poor households (the bottom 20 percent) have lost the most from changes in redistribution over the last two decades.

Several studies use EU-SILC data to analyze the relationship between social effort in European welfare states and poverty.[3] Marx *et al.* (2014) for example show that across the EU tax/transfer systems reduce the risk of poverty by 38 percent on average, but this impact varies from under 15 percent in Bulgaria to around 60 percent in Denmark, Hungary and Sweden. Meyer and Wu (2018) examined the anti-poverty effect of social transfers in the US, by linking administrative data to survey data. All social transfers together cut the poverty rate by around 50 percent. Social security accounts for most of the poverty reduction (33 percent), while means tested programs account for 16 percent.

A second strand of comparative research analyzes the relationship between poverty outcomes and a wide set of independent variables, including welfare state spending but several other economic and demographic variables. Brady (2005) performed a multivariate analysis of relative poverty in 18 Western countries over the period 1967-1997. He concludes that social security transfers and public health spending significantly reduce poverty. The effects of these social programs are much larger than economic and demographic sources of poverty. Kenworthy (1999) studied the effects of social welfare policies on poverty across 15 affluent countries over the period 1960-1991. He finds that pre-tax/transfer poverty is the most important determinant of post-tax/transfer poverty. Yet, social transfers do have a statistically significant negative effect on poverty. Additional spending of 1 percent of GDP on social

[3] Among others Cantillon and Marchal (2016), Lefebvre *et al*. (2010), Marx *et al.* (2014), Valls Fonayet *et al.* (2020).

transfers reduces the absolute poverty rate by .75 percentage points. The results for the relative poverty rate are comparable. Moller *et al.* (2003) use pooled time-series microdata from LIS for 14 countries over the period 1970-1997. They conclude that socioeconomic factors including de-industrialization and unemployment largely determine pre-tax/transfer poverty. Poverty reduction is directly explained by welfare state generosity. The overall size of the welfare state and a strong reliance on child and family allowances are important determinants of poverty reduction. Caminada *et al.* (2012) analyze the impact of social expenditure on poverty for the period 1985-2005, controlling for macroeconomic and demographic differences across countries. They find quite a strong negative relationship between the level of social expenditure and poverty, which confirms the results of earlier studies.

Much attention has also been paid to the poverty reducing effects of taxes and transfers for different age groups. We restrict our review to a study by the OECD (2008). This study indicates that the poverty-reducing effect of taxes and transfers is the strongest for elderly people, because of the importance of (public) pensions. For people of working age, the effect is two thirds of that for people of retirement age. For children the poverty reducing effect is the smallest: around 57 percent of the effect for people of retirement age.

Since relative poverty rates are also a measure of levels of inequality, we also discuss some studies on fiscal redistribution and income inequality. Several studies analyze income distribution across countries, indicating that the role of social policy (taxes and transfers) is important in the magnitude of income redistribution.[4] A recent study by the OECD (Causa and Hermansen, 2017) concludes that redistribution through income taxes and cash transfers cushions income inequality on average by about 27 percent in OECD countries. Two thirds of the redistributive impact can be attributed to cash transfers and one third to income taxes. Jesuit and Mahler (2017) compare the redistributive effects of old-age pensions and transfers to those of working-age in 20 developed countries between the late 1960s and 2010. They find that there is substantial variation across countries in overall fiscal redistribution. Transfers account for the majority of the redistribution. Caminada *et al.* (2019a) analyze fiscal redistribution in 31 countries with LIS data around 2014. They find that social transfers and income taxes reduce the Gini on average by 31 percent. They conclude that the redistributive impact of the welfare state is still substantial after the crisis.

Most studies focus on overall redistribution; others have examined in more detail the impact of income components on overall inequality. Ferrarini and Nelson (2003) focus on the effects of taxation and social insurance in 10 countries around 1995, analyzing inter- and intra-country comparisons of income (re)distribution. Mahler and Jesuit (2006) divide government

[4] Among others, Brandolini and Smeeding (2007 and 2009), Atkinson and Brandolini (2001), Smeeding (2000 and 2004), Gottschalk and Smeeding (1997 and 2000), Kenworthy and Pontusson (2005), Alvaredo and Gasparini (2015) and OECD (2016).

redistribution into several components: the redistributive effects from unemployment benefits, from pensions, and from taxes. They apply their empirical exercise for 13 countries with LIS-data around the years 1999/2000. Caminada *et al.* (2019a and 2019b) updated and extend the analyses of Mahler and Jesuit (2006) by taking into account more benefits and taxes and a wider range of countries with LIS data up-to around 2014. They conclude that on average transfers account for 76 percent of redistribution, while direct taxes account for 24 percent. As far as specific social programs are concerned, in most countries two dominant income components account for 50 to 80 percent of total reduction in income inequality: the public old-age pensions and the survivors schemes (including disability benefits), and the income taxes. However, cross country differences are huge.

3. Research method

3.1 Measuring the antipoverty effects of social transfers and income taxes

The impact of social policy on relative income poverty can be calculated using statutory or budget incidence analysis (Musgrave *et al*. 1974). A standard analysis of the redistributive effect of taxes and income transfers is to compare pre-tax-transfer income poverty or market income poverty and post-tax-transfer income poverty (OECD, 2008: 98 and Kakwani, 1986).

Table 1 presents the framework of accounting income poverty and poverty reduction through various income sources.

TABLE 1. The relative income poverty and poverty reduction accounting framework

Income components	Income poverty and redistributive effect
Labor income + capital income + private transfers = **Market income** (= primary income)	**Income poverty before social transfers and taxes**
+ Social security transfers	-/- Redistributive effect of social transfers
= Gross income	**= Income poverty before taxes**
-/- Income taxes and social security contributions	-/- Redistributive effect of taxes
= Disposable income	**= Income poverty after social transfers and taxes**

Note: Private transfer are for example alimony and other family transfers and private education transfers. For some countries private transfers are not available.

For purposes of international comparisons, poverty is almost always a relative concept. In this study, we use the 60 percent of median income as a standard of poverty. Sensitivity analysis indicates that applying a poverty line of 50 or 40 percent provides more or less the same pattern of antipoverty effects of social benefits and taxes (Caminada *et al.*, 2019c).

3.2 Data: gross and net income datasets in LIS

The LIS Cross-National Data Center in Luxembourg provides the largest available income database of harmonized microdata collected from 49 countries in Europe, North America, Latin America, Africa, Asia, and Australasia spanning five decades. Harmonized into a common framework, LIS datasets contain household- and person-level data of labor income, capital income, social security and private transfers, taxes and contributions, demography, employment, and expenditures. LIS micro data seems to be the best available data for describing how income poverty and the redistributive effects of income taxes and transfers vary across countries (Nolan and Marx, 2009; Smeeding and Latner, 2015).[5]

We apply a cross-national analysis using comparable income surveys for all countries of LIS from 1985-2014. From nearly 300 variables in the dataset, we choose those related to household income (all kinds of income sources), total number of persons in a household and household weight (in order to correct sample bias or non-sampling errors) to measure income inequality and the redistributive effect across countries. In line with LIS convention and the work of Mahler and Jesuit (2006) and Caminada *et al.* (2019c), we have eliminated both observations with zero or a missing value of disposable income from LIS data. Household weights are applied for calculation of poverty rates. Levels of relative poverty can be shown in several ways, e.g., applying different thresholds (40, 50 or 60 percent of median equivalized income).

Country-comparative and trend analyses of income distribution based on LIS gross/net datasets should be done with caution. LIS provides gross income data in most countries and years while providing income data that are net of (income) taxes in others. Of the 339 LIS datasets available at the time of writing, 214 are classified as gross, 103 as net and 22 as 'mixed'; see *Documentation Guide* Dataset (Caminada and Wang, 2019) for a specification.

Our income unit is equivalized household income, using the equivalence scale of LIS. It has been shown that the choice of equivalence scales affects international comparisons of income inequality. Alternative adjustment methods would definitely affect the ranking of countries, although the broad pattern remains the same (Atkinson *et al.*, 1995:52).

As to missing data, we have included households which report zero market income, but have excluded households that report zero disposable income. We have employed standard LIS top- and bottom-coding conventions, top-coding income at 10 times the median of non-equivalized income and bottom-coding income at 1 percent of equivalized mean income.

[5] The distinctive feature and value-added of LIS is the access it provides to a set of harmonized micro data files supplied by participating statistical agencies at the country level (Ravallion (2015: 529): Harmonization of income data increases quality and comparability across nations and across time. See Smeeding and Latner (2015) for a critical review of three other popular data sets which summarize inequality across countries and years (World Development Indicators ('WDI')/'PovcalNet' and 'All the Ginis'). Following Ravallion (2015: 529): There are pros and cons of each source. While WIID is the largest (by far) it is probably the least methodologically consistent internally, while LIS is the smallest but most consistent. PovcalNet and the WDI are somewhere between the two.

It should be noted that there have been controversial arguments regarding the issues in the measurement of income poverty. We simply refer to a vast literature on the sensitivity of measured results to the choice of income definitions, inequality and poverty indices, appropriate equivalence scales, and other elements that may affect results in comparative research.[6]

3.3 Sequential accounting decomposition of income poverty: partial effects of transfers and taxes

In order to get any measure of income poverty, it is essential to make assumptions concerning the criteria based on which to define poverty. LIS uses the approach (which is most commonly adopted in the literature) to create a relative poverty line based on the level and distribution of equivalized household disposable income in the total population. Households are classified as poor or non-poor on the basis of whether their equivalized household disposable income is lower or higher than the relative line.

In order to assess the partial effects of specific transfer benefits and income taxes on income poverty we apply a sequential decomposition technique. This approach has been, among others, advocated by Kakwani (1986). This technique allows us to calculate poverty rates without a certain kind of transfer or tax, and consequently the partial redistributive effect of that transfer or tax. Likewise, the redistributive effects of all income components on poverty within the trajectory between market income and disposable income (like old-age/disability/survivor transfers, sickness transfers, family/children transfers, education transfers, unemployment compensation, housing transfers, general/food/medical assistance transfers and other transfers) can be calculated.

It should be noted, however, that this procedure is somewhat arbitrary since the choice of benchmark income affects the outcome. Applying the redistribution from, say, income taxes on gross income rather than market income alters the outcome to some extent. Since income taxes are levied on gross income (market income plus benefits), the redistributive effects may be underestimated. Nevertheless, the logic of this decomposition of relative poverty is that income taxes are applied to gross income and benefits to market income.

Finally, we should mention that the results to be obtained by using this method will be affected by the ordering effect. For example, the partial antipoverty effect of a specific social transfer will not be the same when computed as the first (last) social program. The partial effects of these transfers in total antipoverty effect can be computed in several orders. We consider every specific social transfer as the first program to be added to market income distribution and

[6] See Caminada *et al.* (2019c) and references listed therein. Recent comprehensive reviews on methodological assumptions underlying international levels and trends in inequality are found in Brandolini and Smeeding (2007 and 2009).

then the last program following all other transfers. Consequently, the antipoverty effect from every specific social transfer is the average of the two effects.

3.4 Focus on total population – including public pension schemes

An important choice in this kind of analysis is whether the total population should be covered or the working-age population only, an approach followed by Causa and Hermansen (2017). A related choice is whether pensions should be earmarked as market income or as transfers and therefore pension contributions as taxes. Unlike most existing studies, we explicitly focus on the total population, although we will present figures for the non-elderly population too (those aged 18-64). Indeed, restricting the analysis to the non-elderly would avoid some of the problems inherent to comparisons of incomes between people who are at different stages in their lives. For instance, an essential function of old-age pensions is to redistribute intertemporally over the life cycle; in that case a focus on the non-elderly helps in understanding the most important elements of interpersonal redistribution. However, we believe that in our analysis the largest government transfer program, public pensions, cannot be excluded. Public pension plans are generally seen as part of the safety net, generating large antipoverty effects, as has been discussed in section 2.1. So, state old-age pension benefits will be included in our analysis on redistribution. But countries differ to a large extent in public versus private provision of their pensions (OECD, 2008:120). Occupational and private pensions are not poverty reducing programs per se, although they too have a significant effect on poverty alleviation when pre-tax-transfer poverty and post-tax-transfer poverty are measured at one moment in time, particularly among the elderly.[7] The standard approach treats contributions to government pensions as a tax that finances the retirement pensions paid out in the same year, while contributions to private pensions are effectively treated as a form of private consumption. This may affect international comparisons of redistribution effects of social transfers and taxes. Overcoming this bias requires a choice: should pensions be earmarked as primary (market) income or as a transfer? We deal with this bias rather pragmatically by following the LIS Household Income Variables List: occupational and private pensions are earmarked and treated as social security transfers (see also Jesuit and Mahler, 2017).

Obviously, our results will be influenced by the focus on the total population instead of non-elderly population (those aged 18-64). Poverty reduction among the total population is higher compared to poverty reduction within the working-age population. However, additional analysis (Caminada *et al.*, 2019c) shows that the correlation between poverty (and poverty

[7] See Been *et al.* (2017) for such an analysis. Preferably, however, the redistributive effects of occupational and private pensions should be analysed on a life time basis.

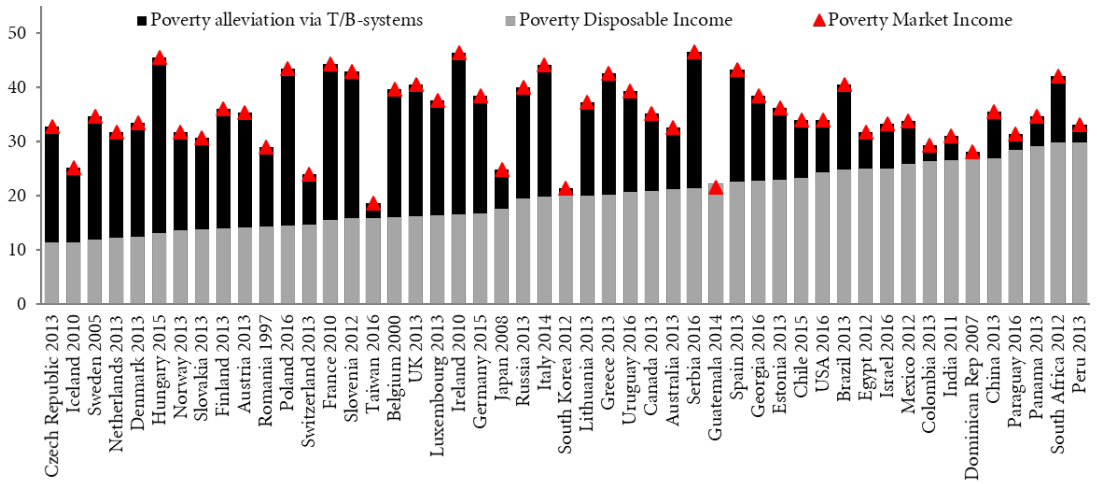
reduction) of total population and poverty (and poverty reduction) of working-age population is rather high. This suggests that focusing on the total population will not give a strong bias.

4. Poverty rates and antipoverty effect of T/B-systems across 49 LIS countries

4.1 Relative income poverty across countries

This section reviews the evidence on cross national comparisons of annual disposable income poverty over 49 nations around 2013. Figure 1 shows the poverty rates, applying a threshold of 60 percent of median equivalized income. Countries are listed in order of their poverty rate of disposable income from smallest to largest.

Figure 1. Disposable and market income poverty (PL60) across 49 LIS countries (latest data year)



Notes:

- For Belgium, Chili, Egypt, Georgia, Hungary, India, Italy, Mexico, Russia, Paraguay, Serbia, Slovenia and Uruguay data for income taxes are not available.
- For Norway 2013, private transfers are not available; we calculate all incomes without adding private transfers.

Source: Caminada and Wang (2019) based on LIS, and own calculations

The lowest poverty rates are found in Nordic countries, Czech Republic and the Netherlands, while large shares of the population are poor in India, Dominican Republic, China, Paraguay, South Africa and Peru.

The pattern of market income poverty (before social transfers and income taxes) is quite different from disposable income poverty. Serbia, Ireland and Hungary have the highest level of market income poverty, with values above 45 percent. Taiwan, South Korea, Guatemala and Switzerland have rather low levels of market income poverty, below 24 percent.

The poverty reducing effect of taxes and social transfers differs considerably across countries. The highest level of poverty reduction is found in Hungary, Ireland, Poland and

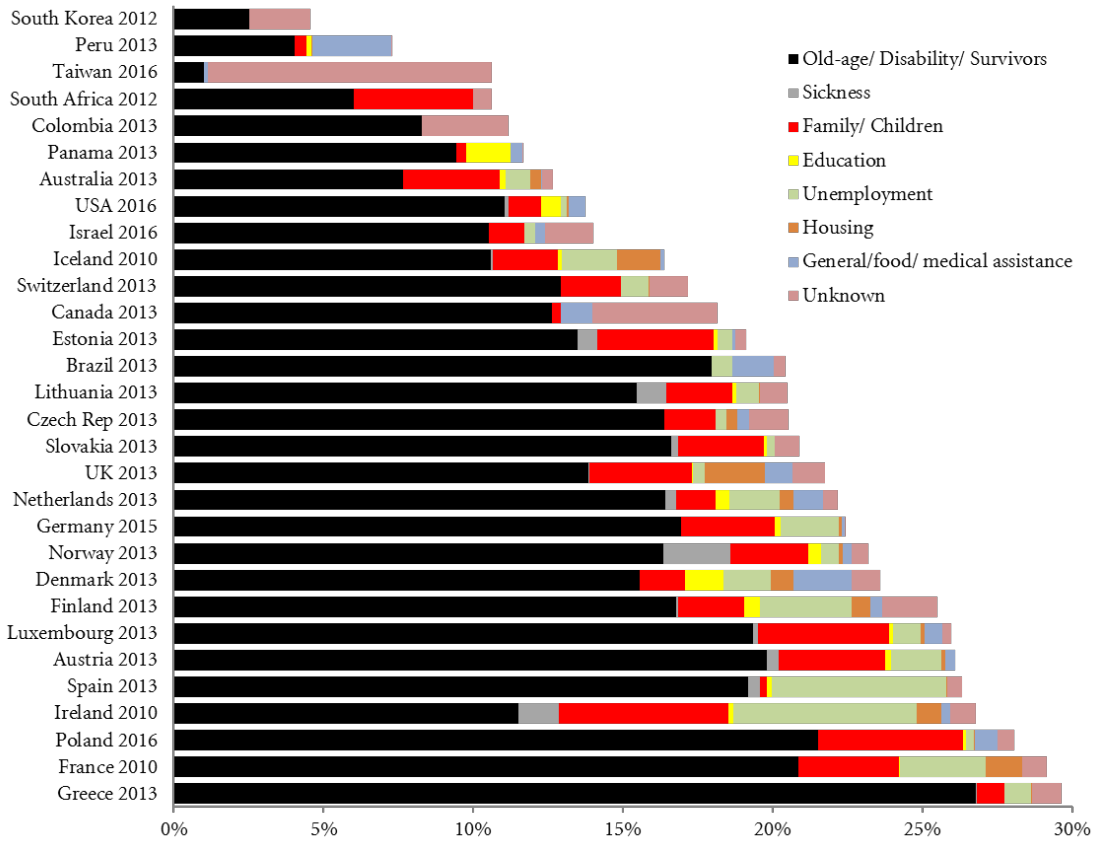
France, while poverty reduction is rather small in Taiwan, Dominican Republic, South Korea and Guatemala. On average, social transfers play a major role of 17.7 percentage points in lifting people above the poverty threshold, while taxes (income taxes and mandatory payroll taxes) account for a negative effect of 2.3 percentage points.

4.2 Decomposition of antipoverty effects of social transfers and income taxes across LIS countries

This section provides detailed results of the antipoverty effect of various welfare state programs across a selection of our countries. We will distinguish 7 different social benefits and income taxes and social contributions, which are based on the LIS household income components list (see *Documentation Guide* (Caminada and Wang, 2019) for details): old-age/disability/survivor transfers, sickness transfers, family/children transfers, education transfers, unemployment transfers, housing transfers, general/food/medical assistance transfers, other social security transfers, and income taxes and social security contributions.

Two aspects of social benefits can explain the antipoverty effects: programs' size and the progressiveness of each social benefit. Figure 2 presents for 30 countries social benefits as a proportion of households' gross income for each benefit categorized in LIS. We observe a considerable variance among developed countries in the average size of social benefits relative to total household income, ranging from 4.6% (South Korea) to 29.6% (Greece). In most countries old-age/disability/survivor transfers account for above 50 to 80 percent of total budget size. Family/children benefits account on average for 10 percent, unemployment compensation benefits for 5 percent and general/food/medical assistance benefits for 4 percent. Rather small social programs are sickness benefits, education transfers and housing benefits, accounting each for on average 1 percent of the total budget size. Transfers not allocated to a specific category (the category *Other transfers*) are somewhat troublesome in our decomposition analysis. In most countries the category Other transfers is rather small (share below 5%), while in Canada (2013), Colombia (2013), Taiwan (2016) and South Korea (2012) it is above 20%.

Figure 2 Social transfers as a proportion of households' gross income



Source: Caminada and Wang (2019) based on LIS, and own calculations

Table 2 presents the results of our sequential accounting decomposition of disposable income poverty for the mean of 26 countries. These 26 countries were selected on the basis of two criteria: 1) the country has full tax/benefit information around 2010 or later; 2) the category *Other transfers* amounts to less than 20 percent of poverty reduction. Among all 26 countries 17.6 percent of total population is lifted above the poverty threshold via the T/B-system (60 percent of mean equivalized income).

Interestingly, only three programs account for the bulk of total poverty reduction: old-age/disability/survivor scheme (81%), social programs for family and children (14%) and the unemployment scheme (8%). Income taxes lower disposable incomes and thus increase poverty. Other social benefit programs appear to have rather limited antipoverty effects.

TABLE 2. Decomposition of disposable income poverty for 26 LIS countries around 2013

	Poverty rate (PL60)	
(a) Poverty market income	36.2	
(b) Poverty disposable income	18.6	
Overall poverty reduction (a-b) = lifted out of poverty	17.6	
		share
Transfers	*20.5*	*117%*
Old-age/Disability/Survivor transfers	14.3	81%
Sickness transfers	0.3	2%
Family/Children transfers	2.4	14%
Education transfers	0.3	2%
Unemployment transfers	1.5	8%
Housing transfers	0.6	3%
General/food/medical assistance transfers	0.7	4%
Other transfers	0.5	3%
Income taxes and social security contributions	*-2.9*	*-17%*

Note: LIS 26: Australia, Austria, Brazil, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Lithuania, Luxembourg, the Netherlands, Norway, Panama, Peru, Poland, Slovakia, South Africa, Spain, Switzerland, the United Kingdom and the United States.

Source: Caminada and Wang (2019) based on LIS, and own calculations

In Table 3 we present the results of the decomposition of the trajectory of the poverty rate from market to disposable income for the 26 countries for the latest data year available in LIS. It can be noted that some social benefits or income taxes do not have any redistributive effect. The meaning of this is twofold. First, such a benefit scheme does not exist in a specific country and/or data is not available in LIS (represented as *blanks*). Second, such a program exists, but does not have a redistributive effect, because the social expenditures of this program are rather low or the program is distributed equally among the population (noted as 0).

TABLE 3. Decomposition of poverty and the redistributive effect of social transfers and income taxes (latest data year)

LIS Dataset	Poverty market income (a)	Poverty disposable income (b)	Poverty reduction n (a-b)	*Partial effects*									
				Old-age/ Disability/ Survivor	Sickness	Family/ Children	Education	Unemployment	Housing	General/food/ medical assistance	Other transfers	Income taxes	Residual
Australia 2016	32.5	21.3	11.2	6.9	0.0	4.1	0.2	0.7	0.4	0.0	0.3	-1.5	0.1
Austria 2013	35.4	14.2	21.2	18.6	0.4	2.7	0.2	2.0	0.2	0.3	0.0	-2.8	-0.2
Brazil 2013	40.5	24.9	15.6	13.9				0.7		1.6	0.5	-1.1	0.0
Czech Republic 2013	32.9	11.3	21.5	19.6		1.4		0.3	0.3	0.2	0.8	-1.0	-0.1
Denmark 2013	33.4	12.4	21.0	20.7		0.9	1.6	1.3	0.6	2.6	0.7	-7.5	0.2
Estonia 2013	36.3	23.0	13.3	13.1	0.2	1.6	0.1	0.5		0.0	0.0	-2.4	0.1
Finland 2013	36.0	14.0	22.0	17.8	0.0	2.0	0.7	3.0	1.2	0.5	1.0	-4.1	0.0
France 2010	44.3	15.5	28.8	20.4		3.6	0.0	2.6	1.8		0.6	-0.2	0.0
Germany 2015	38.4	16.7	21.7	20.7		2.2	0.2	2.1	0.2	0.2	0.0	-4.0	0.0
Greece 2013	42.7	20.1	22.5	25.5	0.0	1.2	0.0	0.7	0.0		0.3	-5.2	0.1
Iceland 2010	25.2	11.5	13.7	12.2	0.1	2.1	0.0	2.1	1.4	0.1	0.0	-4.4	0.1
Ireland 2010	46.4	16.6	29.8	11.9	1.0	6.5	0.3	7.5	1.5	0.4	0.8	-0.4	0.4
Israel 2016	33.4	25.0	8.4	8.2		0.8		0.3		0.2	1.1	-2.2	0.0
Lithuania 2013	37.3	20.1	17.2	16.0	0.3	1.8	0.1	0.8	0.0		1.2	-3.0	-0.1
Luxembourg 2013	37.6	16.4	21.1	17.8	0.1	5.8	0.2	1.5	0.2	0.6	0.4	-5.7	0.3
Netherlands 2013	31.8	12.4	19.5	19.0	0.4	1.0	0.5	1.7	1.2	1.7	0.7	-6.1	-0.7
Norway 2013	31.7	13.6	18.1	17.1	1.3	1.6	0.3	0.6	0.2	0.3	0.6	-4.0	-0.1
Panama 2013	34.6	29.2	5.4	4.3		0.3	1.9		0.0	0.5	0.0	-1.6	0.0
Peru 2013	33.2	29.9	3.3	1.8		0.3	0.1		0.0	1.3	0.0	-0.4	0.0
Poland 2016	43.5	14.5	29.0	21.5		6.1	0.1	0.3	0.1	0.8	0.6	-0.5	0.1
Slovakia 2013	30.7	13.8	16.9	15.8	0.2	2.3	0.0	0.2			0.7	-2.3	0.1
South Africa 2012	42.1	29.8	12.3	8.1		6.4					0.2	-2.5	0.0
Spain 2013	43.3	22.7	20.6	17.1	0.3	0.2	0.2	4.7	0.0		0.3	-2.4	0.0

Switzerland 2013	23.9	14.8	9.1	15.0	0.0	1.0		0.8	0.1		1.8	-9.5	0.0
United Kingdom 2013	40.5	16.3	24.2	14.8	0.0	5.5	0.1	0.4	3.1	1.6	1.3	-2.3	-0.4
United States 2016	33.9	24.3	9.7	9.6	0.1	1.8	0.4	0.2	0.1	0.6	-0.3	-3.0	0.0
Mean LIS-26	36.2	18.6	17.6	14.3	0.3	2.4	0.3	1.5	0.6	0.7	0.5	-2.9	0.0

Note: When we take the mean of the decomposition results across countries, the sum of all partial antipoverty effects amount (a little) over 100 percent due to missing observations. We rescaled the antipoverty effects of each social program by applying an adjustment factor, which is defined as the overall poverty reduction (=100%) divided by sum of all partial antipoverty effects of all programs (over 100%), in order to correct for an over-estimated effect.
Source: Caminada and Wang (2019) based on LIS, and own calculations.

Poverty reduction via T/B-systems is rather large and above 20 percent of the total population in Nordic countries (with the exception of Iceland), Continental European countries (with the exception of Switzerland), and in some Central Eastern European countries. On the contrary, poverty reduction is rather low with figures below 10 percent points in Latin American countries, the United States, Switzerland and Israel.

In most countries the old-age/disability/survivor scheme accounts for above 80 percent of total reduction in income poverty. However, cross country differences are huge. For example, in English speaking countries old-age/disability/survivor schemes account for 40 to 62 percent of poverty reduction (with the United States as an exception), while in Continental European and Nordic countries it contributes much more.

The antipoverty effect of family/children benefits is relatively high in the English speaking countries (with the United States as an exception), compared to Nordic countries, Continental European countries (with the exception of Luxembourg), and in Central Eastern European countries. Unemployment compensation benefits do have some effect too, especially in Continental European countries and Nordic countries. Remarkably, across countries all other social benefit programs seem to have rather limited antipoverty effects.

Large negative effects on poverty alleviation through income taxes and contributions can be found in the United States, Germany, Luxembourg, the Nordic countries and especially in Switzerland.

4.3 Poverty reduction per social program for different age-groups

Table 4 presents the results of our sequential accounting decomposition exercise for different age-groups. Among all 26 countries 17.6 percent of total population is lifted above the poverty threshold via the T/B-system; for the working-age, children and the elderly population the poverty alleviation percentages are 10.0, 9.0 and 58,3 respectively. Not surprisingly, for the elderly almost the full antipoverty effect comes from old age pensions. For the working-age population old age/disability/survivor transfers also contribute the most to poverty reduction (70%), but also family/children transfers (18%) and unemployment transfers (16%) have a substantial contribution. Family/children transfers are the dominant program to lift children out of poverty (57%), while pensions and unemployment benefits account for 29 percent and 18 percent of poverty reduction. Remarkably, the negative contribution of income taxes and social contributions to poverty reduction is the highest for children: -38 percent, compared to -26 percent for the working-age population and only -5 percent for the elderly. Apparently, tax systems in the 26 countries included in this analysis are not very friendly for low income households with children.

TABLE 4. Decomposition of disposable income poverty for different age-groups for 26 LIS countries

	Poverty rate Total population		Poverty rate WA-population (18-64 years)		Poverty rate Children (0-18 years)		Poverty rate Elderly (65 and over)	
(a) Poverty market income	36.2		26.5		31.1		78.8	
(b) Poverty disposable income	18.6		16.5		22.2		20.5	
Overall poverty reduction (a-b) = population lifted out of poverty	17.6		10.0		9.0		58.3	
		share		*share*		*share*		*share*
Transfers	*20.5*	*117%*	*12.6*	*126%*	*12.5*	*139%*	*61.2*	*105%*
Old-age/Disability/Survivor transfers	14.3	81%	7.0	70%	2.6	29%	59.0	101%
Sickness transfers	0.3	2%	0.3	3%	0.3	4%	0.1	0%
Family/Children transfers	2.4	14%	1.8	18%	5.2	57%	0.4	1%
Education transfers	0.3	2%	0.4	4%	0.3	4%	0.0	0%
Unemployment transfers	1.5	8%	1.6	16%	1.6	18%	0.3	1%
Housing transfers	0.6	3%	0.5	5%	0.8	9%	0.5	1%
General/food/medical assistance transfers	0.7	4%	0.7	7%	0.9	10%	0.3	0%
Other transfers	0.5	3%	0.5	5%	0.7	7%	0.5	1%
Income taxes and social security contributions	*-2.9*	*-17%*	*-2.6*	*-26%*	*-3.4*	*-38%*	*-3.0*	*-5%*
Residual	0.0	0%	0.0	0%	-0.1	-1%	0.1	0%

Note: LIS 26: Australia, Austria, Brazil, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Lithuania, Luxembourg, the Netherlands, Norway, Panama, Peru, Poland, Slovakia, South Africa, Spain, Switzerland, the United Kingdom and the United States.

Source: Caminada and Wang (2019) based on LIS, and own calculations.

5. Discussion

5.1 Research method

As we have mentioned in the introduction, the budget incidence approach we follow in this paper is widely used in the literature on redistributive effects of the welfare state. However, this methodology has some shortcomings. Evidently, without the T/B-system, the average at risk of poverty rate would be considerably higher than it is in reality. It should however be noted that the indicator of income poverty before social transfers must be interpreted with caution (Kim, 2000; Nell, 2005). First, some transfers that can also have the effect of the disposable incomes of households and individuals are not taken into account, namely transfers in kind, tax credits and tax allowances. Second, the pre-transfer poverty is compared to the post-transfer poverty keeping all other things equal – namely, assuming unchanged household and labor market structures, thus disregarding any possible behavioral changes that the situation of absence of social transfers would involve. In essence, budget incidence analyses assume that labor supply decisions in a situation with social transfers and social security are equal to a situation without social transfers. Thus, this standard approach biases the measured

redistributive effect of welfare systems. Our estimates for poverty alleviation through taxes and transfers of each country should consequently be regarded as upper bounds.

5.2 Data sources

Our analysis is based on the Luxembourg Income Study database. Also the OECD Income Distribution Database (OECD IDD) and the database from Eurostat EU-Silc are frequently used for comparative analyses; see section 2. All datasets have strengths and limitations. LIS's micro-data seem to be the best available data to compare income poverty and redistribution through social benefits and income taxes from country to country and over time because the data have been harmonized (Nolan and Marx, 2009; Smeeding and Latner, 2015; Ravallion, 2015). Unfortunately, recent data years are not yet available for many countries in LIS. OECD IDD data is very recent, but it is not micro-data, but requested data collected by submitting an identical questionnaire to consultants from each country. The comparability of the reported data may be a problem. Eurostat EU-Silc cross-sectional files mainly cover European countries, while our analysis includes countries all over the world.

To check the robustness of our results we carried out a sensitivity analysis by performing all calculations (in addition to LIS data) with the data of the OECD IDD and Eurostat EU-Silc as well for the countries and years 2010 or later that are available in each dataset. Table 5 shows the results for 21 common countries.

TABLE 5. Lifted out of poverty per country around 2013 as measured by several data sources

	LIS around 2013 (PL60, total population)				*Difference LIS - OECD IDD*				*Difference LIS – Eurostat EU-Silc*			
	Data year	Poverty market income	Poverty disposable income	Poverty reduction via T/B-system	Data year	Poverty market income	Poverty disposable income	Poverty reduction via T/B-system	Data year	Poverty market income	Poverty disposable income	Poverty reduction via T/B-system
Austria	2013	35.4	14.2	21.2	-	0.2	0.0	0.2	-	-8.7	-0.2	-8.5
Czech Republic	2013	32.9	11.3	21.5	-	0.2	0.2	-0.1	-	-4.0	2.7	-6.8
Denmark	2013	33.4	12.4	21.0	2010	6.4	-0.8	7.2	-	-8.1	0.5	-8.6
Estonia	2013	36.3	23.0	13.3	-	-0.9	-0.5	-0.4	-	-3.3	4.4	-7.7
Finland	2013	36.0	14.0	22.0	2012	0.7	0.3	0.4	-	-5.7	2.2	-7.9
France	2010	44.3	15.5	28.8	2011	4.5	1.0	3.5	-	-0.2	2.2	-2.4
Germany	2015	38.4	16.7	21.7	2014	2.1	1.1	1.0	-	-5.5	0.0	-5.5
Greece	2013	42.7	20.1	22.5	-	1.0	-0.8	1.7	-	-10.7	-3.0	-7.8
Iceland	2010	25.2	11.5	13.7	-	0.0	0.8	-0.8	-	-7.8	1.7	-9.5
Ireland	2010	46.4	16.6	29.8	-	-0.9	1.0	-1.9	-	-3.7	1.4	-5.1
Italy	2014	44.1	19.9	24.2	2013	6.5	0.6	5.9	-	-1.7	0.5	-2.2
Lithuania	2013	37.3	20.1	17.2	-	0.0	0.1	-0.1	-	-9.3	-0.5	-8.8
Luxembourg	2013	37.6	16.4	21.1	-	0.5	0.8	-0.4	-	-7.7	0.5	-8.3
Netherlands	2013	31.8	12.4	19.5	2012	2.0	-1.4	3.5	-	-5.4	2.0	-7.3
Norway	2013	31.7	13.6	18.1	2011	4.7	0.3	4.4	-	-6.3	2.7	-9.0
Poland	2016	43.5	14.5	29.0	2015	10.6	-3.6	14.1	-	0.4	-2.9	3.2
Slovak Republic	2013	30.7	13.8	16.9	-	-2.7	-3.7	1.0	-	-7.3	1.0	-8.3
Slovenia	2012	42.9	15.9	26.9	2012	8.7	0.3	8.3	-	1.0	2.4	-1.5
Spain	2013	43.3	22.7	20.6	-	0.3	0.0	0.3	-	-2.2	2.3	-4.5
Switzerland	2013	23.9	14.8	9.1	-	5.3	-1.5	6.8	-	-11.0	0.3	-11.3
United Kingdom	2013	40.5	16.3	24.2	2010	5.1	-0.9	6.0	-	-4.7	0.4	-5.1
Mean (21 common countries)	2012.8	37.0	16.0	21.1	2012.1	2.6	-0.3	2.9	-	-5.4	1.0	-6.3

Source: OECD IDD (2018), Eurostat EU-Silc (2020) and Database Caminada & Wang (2019)

Note that levels of disposable income poverty across countries are almost the same, while levels of market income poverty show more variation across databases. On average market income poverty is highest in Eurostat EU-Silc (42.4%) followed by LIS (37.0%) and OECD IDD (34.5%). Consequently, the share of population lifted out of poverty via T/B-systems is on average highest in Eurostat EU-Silc (27.4%) followed by LIS (21.1%) and OECD IDD (18.2%). The correlation between the figures on poverty reduction are quite high: the correlation coefficient of LIS-data and data from OECD IID is 0.738 and for LIS-data and data from Eurostat EU-Silc 0.783. Moreover, when we rank all 21 common countries from low to high for poverty reduction around 2013, the patterns are more or less the same. Thus, this sensitivity analysis supports the conclusions we draw based on data from LIS.

6. Conclusion

In this paper, we have investigated income poverty and the poverty reducing effect of social transfers and income taxes across countries and over time, using the micro household income data from LIS. On average across 49 countries, 15.3 percent of the total population is lifted out of poverty via tax/benefit-systems around 2013. Social transfers reduce market income poverty 17.7 points, while income taxes increase poverty with 2.3 points. A sensitivity analysis using data from OECD and Eurostat shows comparable figures, so these results seem to be quite robust. We have to mention, however, that the methodology used does not account for behavioral effects of transfers and taxes.

More detailed analysis for 26 countries shows that poverty reduction for the working-age population and children is lower (on average) with figures of respectively 10 and 9 percent. In contrast, poverty reduction via tax/benefit-systems among the elderly is much higher: 58 percent of the elderly is lifted out of poverty on average. Best-practices are found in the Netherlands, France and Luxembourg with antipoverty effects above 75 percent. We should add that these figures are strongly influenced by our choice to earmark old age pensions as transfer income and not as market income.

The main contribution of this paper is the detailed decomposition of the poverty reducing effect into several programs (for 26 countries). Only three programs account for the bulk of total poverty reduction: old-age/disability/survivor scheme (81%), social programs for family and children (14%) and the unemployment scheme (8%). Income taxes lower disposable income and thus increase poverty. Other social benefit programs appear to have rather limited antipoverty effects. These results are consistent with our theoretical expectations that old-age pensions have the strongest anti-poverty impact because of their big budget size and often flat-rate benefits. Social programs for families and children are typically targeted to low income families and have a strong poverty reducing effect for a given amount of spending, but their budget size is usually relatively small. Most unemployment schemes have earnings-related

benefits and thus a less redistributive character, but spending on these programs is often substantial.

This empirical analysis is mainly descriptive. It does not show why social benefits and income taxes are more or less redistributive. It can be expected that, as market income inequality is higher, the tax-benefit systems will automatically have a more redistributive impact, because of the progressivity built into these systems. But policy choices will certainly explain a large part of the redistribution. Future research should shed some light on the impact of specific policies in changing the antipoverty effect of welfare states.

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