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### **Relative income poverty rates and poverty alleviation via tax/benefit systems in 49 LIS-countries, 1967-2016**

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# Relative income poverty rates and poverty alleviation via tax/benefit systems in 49 LIS-countries, 1967-2016

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## Abstract

Most welfare states design their tax/benefit system to combat income poverty. Some countries are more effective in poverty alleviation than others. What can explain these variations in outcomes and effectiveness? And has the redistributive power of different social programs changed over time and across countries?

This paper analyzes the effectiveness of social transfers and income taxes in alleviating poverty. We focus on 49 LIS-countries for the period 1967-2016. We compare relative income poverty rates at the levels of market incomes and disposable incomes, that is before and after social transfers and income taxes, in order to analyze the effect of tax and transfer policies in reducing income poverty, i.e. to determine the target efficiency of social transfers. We perform several tests with the most recent data. Finally, we perform several partial analyses by disaggregating poverty rates to socioeconomic and demographic conditions in order to investigate to what extent variations at the social program level (such as old age pensions, child benefits) affect the measured effectiveness of the welfare state in alleviating income poverty.

We use micro-data from the Luxembourg Income Study (LIS) to examine household market income poverty and disposable income poverty, the antipoverty effect of social transfers and income taxes, and the underlying social programs that drive the changes. LIS data are detailed enough to allow us to measure both overall poverty reduction, and the partial effects of poverty reduction by several taxes or transfers. We elaborate on the work of Caminada et al (2017, 2018 and 2019). LIS data also allow us to decompose the trajectory of the market income poverty to disposable income poverty in several parts (i.e. 9 different benefits and income taxes and social contributions).

The *Leiden LIS Budget Incidence Fiscal Redistribution Dataset on Relative Income Poverty (LLBIFR Dataset on Relative Income Poverty 2019)* allows researchers and public policy analysts to compare antipoverty effects across developed countries and middle income countries over the last five decades. Research may employ these data in addressing several important issues. Changes (in the generosity) of welfare states can be linked to changes in the antipoverty effects. Best-practices among countries can be identified and analyzed in detail. The *LLBIFR on Relative Income Poverty 2019* with its detailed data on income taxes and a large number of individual social benefits offers a rich source of information which may be used by scholars and policy analysts to study the effects of different social programs on economic well-being.

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 and 2016). The persistence of poverty in welfare states calls for an explanation. If these welfare states offer elaborate systems of income maintenance, why is there still a considerable amount of poverty? And why are antipoverty outcomes so different in countries?

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 equivalised disposable income less than 50 per cent of the median income.

There are several ways to combat poverty, but income transfers seem to be an important instrument. 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 (Behrendt, 2002). For example, Smeeding claims in several papers (2005: 974) 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’. The strong cross-country association between high welfare state effort and low income poverty would suggest that increasing spending in currently low-effort countries would lead to a downward convergence in poverty outcomes.

Critics argue, however, that poverty is a multidimensional problem (Kakwani & Silber, 2007, 2008). And also, social expenditure ratios may not be good indicators for social policy efforts. For example, expenditure ratios do not capture the impact of the tax system and of private social arrangements (Esping-Andersen & Myles, 2009).

One of the main driving forces behind disposable income poverty is the reduction of market income poverty via the tax-transfer system.<sup>1</sup> The overall redistributive effect can be divided into redistribution by transfers and by taxes, or even into more details.<sup>2</sup> In the mid-2000s, the average redistributive effect achieved by public cash transfers is twice as large as that achieved through household taxes, although for example the United States stands out for achieving a greater part of redistribution by taxes (OECD, 2015; Whiteford, 2010; Caminada et al, 2017). As the tax and transfer system was only able to offset a part of the rise in market income inequality over the last

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1 Among others Blank & Blinder (1986), Blank et al (1993), Cantillon et al (2003), Danziger et al (1981), O’Higgins et al (1990), Ferrarini et al (2015), Gottschalk & Smeeding (1997, 1998 and 2000), Atkinson & Brandolini (2001), Smeeding (2000, 2004 and 2008), Caminada & Goudswaard (2009 and 2010), Caminada et al (2012a), Brady (2004 and 2005).

2 Among others Plotnick (1984), Ferrarini & Nelson (2003), Caminada & Goudswaard (2001), Caminada et al (2017, 2018 and 2019), Kristjánsson (2011), Fuest et al (2010), Paul (2004), Chen et al (2011), Wang & Caminada (2011a), Wang et al (2012 and 2014).

25 years, disposable income (i.e. after taxes and social benefits) has also become more unequal in many countries.

This paper examines changes in the antipoverty effects of social transfers and income taxation to households in detail. Former, extensive literature on "welfare state retrenchment" that has emerged over the last decades seems to imply that welfare states have become less redistributive. Recent studies and data, to the contrary, show that most welfare states became more redistributive in the 1980s and 1990s (Kenworthy & Pontusson, 2005 and Caminada et al, 2018 and 2019). Welfare states have not compensated completely for the rise in inequality of market income among households, but most have done so to some degree. By and large, welfare states have worked the way they were designed to work. It is markets, not redistribution policies, that have become more inequalitarian. It should be noted here that because tax-benefit systems are generally progressive, one could expect that higher market income inequality automatically leads to more redistribution, even without policy actions (Immervoll & Richardson, 2011).

The growing interest in national and cross-national differences in earnings, income inequality and poverty has produced a wide range of studies. An important development has been the launching of the Luxembourg Income Study (LIS) in which microdata-sets from various countries have been "harmonized". Consequently, it is possible to study income inequality across countries and years (see Atkinson et al, 1995). However, the improvement in methods of measurement and in empirical knowledge is in contrast with the lack of insight into causes of changes in equality and poverty over time.<sup>3</sup> This should perhaps not come as a surprise as the distribution of income in a country is the outcome of numerous decisions made over time by households, firms, organizations and the public sector. One could think of an almost infinite number of micro-level causes for differences and changes in income inequality (Gottschalk & Smeeding, 2000). For many countries important forces behind poverty and growing disposable income inequality are the growth of inequality of earned primary income, demographic changes, changes in household size and composition, and other endogenous factors. However, the evolution of income inequality is not simply the product of common economic forces: it also represents the impact of institutions and national policies (Atkinson, 2015).<sup>4</sup>

Our analysis of the level and the evolution of income poverty and antipoverty effects of tax/benefit (T/B)-systems is based on LIS data on income in a standardized way across countries and time. In this paper, we focus on the effect of income taxes (including social contributions) and social transfers in reducing income poverty. Our expectation is that social transfers are mainly directed to lower income groups, while income taxes are mainly paid by the rich, and therefore both will have an impact on income (re)distribution and poverty. We use the traditional 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. The change in relative poverty rates between pre- and post-government income

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3 OECD (2008, 2011 and 2015) summarizes trends and driving factors in income distribution and poverty on the basis of a harmonized questionnaire of OECD Member Countries (i.e., distribution indicators derived from national micro-economic data).

4 More on this: OECD (2015). The report is 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. It questions how trends in inequality have affected economic growth; looks at the consequences of the recent period of crisis and fiscal consolidation on household incomes; analyses the impact of structural labor market changes; documents levels of wealth concentration; and discusses the role for redistribution policies in OECD.

represents the antipoverty effect of the T/B-system. For example, the mean of pre-government relative poverty rate of the 49 countries in this study around 2012 was 35 percent (PL60). After adding government transfers and deducting income taxes and social insurance contributions the poverty rate fell to 20 percent, representing that 15 percent of the population was lifted out of poverty via T/B-systems, i.e. lifted above a threshold of 60 percent of the equivalized median income. Social benefits account for 17 points of this poverty reduction, while mandatory payroll taxes and income taxes increased poverty by 2 points.

We present empirical results by analyzing *levels* of relative income poverty across countries for the latest data year available (around 2013) and by analyzing *trends* (1967-2016). Many factors make it difficult to compare the redistributive effect of social transfers and income taxes across countries (differences in income concepts, income units, (summary) measures, equivalence adjustments and other factors). Moreover, there are numerous possible ways to analyze the impact of social transfers and income taxes on the distribution of income and poverty; some of these approaches are listed in our references.<sup>5</sup> It is generally agreed upon that there is no single 'correct' methodology. However, the budget incidence approach is - still - a standard methodology for studying the combined effects of all taxes and transfers on poverty and inequality.

Our contribution to the literature is threefold.

- ♥ First, we provide evidence on both levels of poverty and the poverty reducing effect of welfare state regimes by social transfers and income taxes across countries. Empirical data on the redistribution of income (= lifting people out of poverty via T/B-systems) across countries is rare. Researchers conducting cross-national studies of the welfare state have until very recently been forced to rely on such proxies as the share of social benefits in gross domestic product. Even fewer cross-national studies have examined the role of social transfers and income taxes in alleviating income poverty. This has changed recently by the work of OECD (2015), Jesuit and Mahler (2017) and Caminada et al (2018 and 2019). We elaborate on the work of Caminada et al (2017). We offer a user-friendly dataset, the *Leiden LIS Budget Incidence Fiscal Redistribution Dataset on Relative Income Poverty (LLBIFR Dataset on Relative Income Poverty 2019)*. Our dataset covers a larger number of countries (49) for a long period (1967-2016) using the latest LIS data available. To obtain a consistent time-series, all calculations used the new 2011 LIS Template (no break in time-series). Moreover, we offer a user-friendly version of the database allowing users to easily select relative income poverty variables and poverty reduction variables for (a group of) countries and/or specific data years via pivot tables.
- ♥ Secondly, we confront results obtained by the OECD with the results of the LIS database on both poverty and the antipoverty effect of social transfers and income taxes across countries. The Luxembourg Income Study (LIS) offers micro-data on public and private sources of income that are comparable, detailed and accurate. Specifically, the LIS offers data on a large number of individual sources of income from both the private and public sectors. Moreover, the LIS data permit researchers to adjust for taxes and social insurance contributions assessed on income recipients. Using the LIS data set, it is possible to estimate direct redistribution for a large number of developed countries and middle income countries. Our aim is to offer a dataset on poverty reduction that is more accurate, comparable, detailed and recent than those that have been used in past work.

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5 Among others, see Atkinson et al (1995, 2001), Caminada & Martin (2011 and 2015), Gottschalk et al (1997), Gustafson & Johanson (1997), Hauser & Becker (1999), Lambert (1993), Lambert et (2010), Moene and Wallerstein (2003), Ravallion (2015), Smeeding (2004), Smeeding & Latner (2015), Swabish et al (2006), Wang et al (2017), Whiteford (2008).

♥ Finally, we refine our method. We undertake a more detailed study (compared to Wang et al, 2012), containing a simulation approach which allows us to decompose (the change in) relative income poverty through income taxes and several social transfers. We employ a budget incidence simulation model to investigate to what extent several social transfers and income taxes reduce income poverty in 49 countries.

The paper is organized as follows. In Section 2 we summarize literature on both poverty and the poverty reducing effect of social transfers and income across countries. Section 3 presents our research method. Section 4 provides a descriptive analysis of relative income poverty and poverty alleviation via T/B-systems across 49 countries around 2012. Section 5 focusses on vulnerable groups (children, the elderly and working-age population) and decompose poverty by age groups to illustrate what share of age-groups is lifted out of poverty via T/B-systems. Section 6 presents the empirical results of our detailed decomposition of the antipoverty effect of several social transfers and income taxes across countries. Section 7 provides an analysis of trends in poverty of market and disposable income in LIS countries for the period 1967-2016. Section 8 presents results for the decomposition of the poverty reducing effects of social transfers and income taxes over time. Section 9 concludes the paper and provides a research agenda.

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

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. In an important study 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. In percentage points the poverty reducing effect ranges from less than 10 points in Korea, Switzerland and the US to more than 20 points in Belgium, Czech Republic, Sweden, France, Germany, Italy and Poland. Countries with higher market-income poverty are not necessarily those with higher disposable-income poverty. Over time, the OECD finds that that market income poverty has strongly increased from the mid-1980s to the mid-1990s in the 17 countries for which data are available. This increase was only partly offset by a slightly higher poverty reducing effect of social transfers and taxes. From the mid-1990s to the mid-2000s market income poverty was more or less stable, but the poverty reduction achieved by the welfare state has dropped, resulting in higher disposable income poverty rates. Again, differences between countries are substantial. Cantillon (2018) argues that these cross country differences make it difficult to draw general conclusions on the poverty reducing capacity of welfare states. However, in most countries welfare state efforts have been far from sufficient to keep poverty in check. Marx et al (2014) 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. In percentage points the poverty reducing effect ranges from 3,5 in Bulgaria to 17 in Hungary and Sweden. Meyer and Wu (2018) examined the anti-poverty effect 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. Causa & 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. Exceptions are Greece, Ireland, Spain and Portugal. This is probably due to the strong increase in unemployment during the crisis in these countries, which implied more unemployment benefits and more redistribution. In Italy however, rapidly rising unemployment did not go along with more redistribution towards the poor.

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 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 (2012b) 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.

Considering the poverty reducing effect of social transfers, several studies have distinguished between programs' size and the extent to which they are targeted toward low-income groups by means-testing. Institutions like the World Bank and the EU have stressed the importance of the structure of social protection systems. Well-designed targeted programs were supposed to be more effective in terms of poverty alleviation. In fact, since the 1980s means tested expenditure has risen sharply in affluent countries. However, several empirical studies have shown the limitations of targeting for poverty reduction. Korpi & Palme (1998) surprisingly found a negative relationship between targeting and poverty rates. The more countries target benefits to low income groups, the smaller their redistributive budgets. They argue that universal social policies have stronger support and therefore reduce poverty more effectively than targeted policies. Kenworthy (2011) however, updated the analysis by Korpi & Palme and he finds that after 1995 the negative relationship between targeting and poverty is not so clear. In a recent study Ferrarini et al (2015) analyzed program size versus targeting using multilevel logistic regression based on LIS data for 40 countries. Their results show that the size of transfer programs is a more important factor than targeting in explaining cross country differences in poverty. This conclusion holds for the whole population as well as for the elderly population,

while sensitivity analyses indicate that the finding is robust. McKnight (2015) used a long time series for four EU countries – France, Italy, Sweden and the UK – to examine the effect of targeting. She finds a negative relationship between the concentration of social transfers and their effectiveness in reducing poverty.

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. Especially for the working age population the poverty-reducing effect of taxes and transfers has decreased since the mid-1980s according to the OECD.

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.<sup>6</sup> Kenworthy & Pontusson (2005) examined the trend in market income inequality and redistribution in OECD countries in the 1980s and 1990s, indicating that redistribution increased in most countries. Welfare state policies compensated for the rise in primary income inequality across countries.

A recent study by the OECD (Causa & Hermansen, 2017) concludes that redistribution through income taxes and cash transfers cushions income inequality on average by about 27 percent in OECD countries. This effect would be larger when non cash transfers such as education and health care would be taken into account. Two thirds of the redistributive impact can be attributed to cash transfers and one third to income taxes. The OECD (2016) also finds that redistribution has weakened or stagnated since 2010 in most OECD countries, although there are exceptions. In countries that were hit hard by the crisis, like Greece, Spain and Portugal, redistribution has increased, despite fiscal consolidation measures, because most social transfers, e.g., unemployment benefits work as automatic stabilizers, and their purpose is to increase in the times of economic downturn. Jesuit & 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 (2018) 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 & 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 & Jesuit (2006) divide government 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 (2018) updated and extend the analyses of Mahler & Jesuit (2006) by taking into account more benefits and taxes, and apply a budget incidence analysis to a wider range of countries with LIS data up-to around 2014. They conclude that on

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6 Among others, Brandolini & Smeeding (2007a and 2007b), Atkinson & Brandolini (2001), Smeeding (2000, 2004 and 2008), Gottschalk & Smeeding (1997, 1998 and 2000), Atkinson (2003), O'Higgins et al (1990), and Brady (2004 and 2005).

average transfers account for 76 percent of redistribution, while direct taxes account for 24 percent. They also find that this redistributive effect can almost fully be attributed to the budget size of transfers, while the extent to which benefits are targeted toward low income groups does not seem to play a significant role. 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. Studies that apply tax-benefit instruments sequentially also suggest that the redistributive effect of transfers is much more important than taxes (e.g. Jesuit & Mahler; Wang et al, 2012 and 2014).

A number of studies are using the EUROMOD microsimulation model to analyze the distributional impact of transfers and taxes. De Agostini et al (2014) analyze the tax-benefit policy reforms that have been implemented after the Great Recession. They find that the changes in direct taxes, pensions and cash benefits had broadly inequality-reducing effects, except in Germany. However, after including the VAT, the policy package appears to have been more regressive. Hills et al (2014) point out that most of the structural policy changes, especially those introduced in the 2007-2011 crisis onset period, have inequality-increasing effects. Avram et al (2014) analyze different types of policies in reducing income disparities. They conclude that pensions and direct taxes have the strongest impact on redistribution, despite low progressivity of these programs in some countries. Thus, the size of the programs matters more, than their targeting to lower income groups. As suggested by Figari & Paulus (2015), the overall redistributive effect of the tax-benefit systems heavily depends on the income concept concerned. They introduce an extended income concept, which also includes indirect taxes, imputed rent and in kind benefits. Applying this concept to three European countries (Belgium, Greece and the United Kingdom), they find that differences in redistribution across countries become smaller.

### 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 and post-tax-transfer income poverty (OECD 2008: 98). Our measure of the redistributive impact of social security on poverty is straightforwardly based on formulas developed by Kakwani (1986) and Ringen (1991):

$$\text{Antipoverty effect of social transfers and income taxes} = \text{market income poverty} - \text{disposable income poverty}$$

This formula is used to estimate the reduction in poverty produced by taxes and social transfers, where market income poverty is given by a summary statistic of pre-tax, pre-transfer incomes and disposable income poverty is given by the same summary statistic of disposable equivalent incomes; see section 3.2 for more details. Table 1 presents the framework of accounting income poverty and poverty reduction through various income sources; see *Documentation Guide LLBIFR Dataset on Relative Income Poverty 2019* for details on the LIS Household Income Components List.

**Table 1 The relative income poverty and poverty reduction accounting framework**

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

For some countries and years, private transfers<sup>7</sup> are not available, including Canada (1997, 1994, 1991, 1987, 1981, 1975, 1971), Czech Republic (1996, 1992), Italy (1986), Norway (2013, 2010, 2007), Poland (1986), Romania (1997, 1995), Slovakia (1992), Spain (1985, 1980), Sweden (1981, 1967). China (2013) and Taiwan (1995) have no information on private transfers or social security transfers. Austria (1995, 1987) only has information on disposable income. For cases without information on private transfers, we calculate all incomes without adding private transfers.

Evidently, without the T/B-system, the average poverty risk would be considerably higher than it is in reality.<sup>8</sup> It should however be noted that the indicator of income poverty before social transfers must be interpreted with caution (Kim, 2000b; 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. However, behavioral responses – with the strongest effects on reducing work effort - have been at the heart of the policy debates shaping the evolution of antipoverty policy.<sup>9</sup> Kim (2000b) showed that both the generosity and efficiency of the T/B-system may influence the level of pre-tax-transfer income inequality and poverty. Budget incidence calculations can only be seen as an approximation of the redistributive effects because the assumption that agents behave similar in situations with and without social transfers and social security. One may imagine the labor supply decision in absence of social transfers and social security. It is likely that in the absence of social transfers more people will work (more) thereby earning higher incomes and having consequences for income inequality and poverty. 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. So, this standard approach biases the redistributive effect of generous and/or

7 Private transfer are for example alimony and other family transfers and private education transfers.

8 Among others, see Behrendt (2002), Smeeding (2005), Förster (2000), Förster & Pearson (2002) and Förster & Mira d'Ercole (2005).

9 We refer to a seminal review by Danziger, Haveman & Plotnick (1981).

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

### 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.<sup>10</sup> The LIS database allows scholars to access the microdata, so that income inequality measures, poverty and fiscal redistribution (and the partial effect per social program) can be derived consistently from the underlying data at the individual and household level. LIS micro data seems to be the best available data for describing how income inequality and the redistributive effects of taxes and transfers vary across countries (Nolan & Marx, 2009; Smeeding, 2008).

We apply a cross-national analysis using comparable income surveys for all countries of LIS from 1967-2016, allowing researchers to make comparisons in a straightforward manner, and the information is still updating and expanding. This dataset contains all countries in LIS: Australia, Austria, Belgium, Brazil, Canada, Chili, China, Colombia, Czech Republic, Denmark, Dominican Republic, Egypt, Estonia, Finland, France, Germany, Georgia, Greece, Guatemala, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Lithuania, Luxembourg, Mexico, the Netherlands, Norway, Panama, Paraguay, Peru, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, the United Kingdom, the United States, and Uruguay.<sup>11</sup> 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 & Jesuit (2006) and Caminada et al (2017), 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 for 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 LLBIFR Dataset on Relative Income Poverty 2019* for a specification.

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10 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 & 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.

11 It should be noted that Taiwan is regarded by China as a district of China, while in this comparative study we simply refer to Taiwan (as coded by LIS).

Datasets on Chili, Egypt, Georgia, Hungary, Italy, Mexico, Paraguay, Russia, Serbia, Slovenia and Uruguay have always been net. Belgium, Greece, Ireland, Luxembourg, Slovakia and Spain are covered by both gross and net datasets, at different points in time. In the net dataset, poverty of gross income would be equal to poverty of disposable income. Mixed datasets are a special case in which total income can be gross of income taxes but net of contributions, or vice versa. Mixed datasets apply to Austria (1995, 1987), China (2002), Colombia (2013, 2010, 2007), Estonia (2000), France (2010, 2005, 2000, 1994, 1989, 1984, 1978), Paraguay (2004) and Poland (2016, 2013, 2010, 2007, 2004, 1999, 1995).

**Table 2 Datasets with gross and net income data in LIS**

	Gross incomes		Mixed		Net incomes		Total	
	# obs	# datasets	# obs	# datasets	# obs	# datasets	# obs	# datasets
Historical wave	185,254	9	-	-	-	-	185,254	9
Wave I	148,766	10	10,468	1	23,921	1	183,155	12
Wave II	209,080	16	22,610	2	43,016	7	274,706	25
Wave III	225,200	17	8,603	1	135,030	11	368,833	29
Wave IV	482,424	21	62,522	3	173,926	19	718,872	43
Wave V	371,893	19	64,879	4	200,341	17	637,113	40
Wave VI	548,077	28	50,165	3	185,246	10	783,488	41
Wave VII	757,944	29	52,865	2	176,904	9	987,713	40
Wave VIII	801,188	32	69,048	3	278,971	12	1,149,207	47
Wave IX	788,889	29	50,977	2	164,773	11	1,004,639	42
Wave X	109,212	4	36,803	1	149,396	6	295,411	11
Total	4,627,927	214	428,940	22	1,531,524	103	6,588,391	339
Anglo-Saxon	1,169,111	35	-	-	-	-	1,169,111	35
EU15	1,483,386	92	108,439	9	226,025	37	1,817,850	138
Europe - other	792,132	20	-	-	30,946	7	823,078	27
BRICS	490,020	8	17,112	1	104,349	7	611,481	16
Latin America	185,378	12	53,205	4	1,086,663	34	1,325,246	50
CEE	215,795	20	250,184	8	71,692	17	537,671	45
Middle East	68,219	11	-	-	11,849	1	80,068	12
South-East Asia	223,886	16	-	-	-	-	223,886	16
Total	4,627,927	214	428,940	22	1,531,524	103	6,588,391	339

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

It should be noted that there have been controversial arguments regarding the issues in the measurement of income poverty. These arguments have their own merits and shortcomings, and there has been little professional consensus among researchers with regard to the theoretical superiority of a particular way of measuring poverty. The aim of this database is *not* to review definitional issues that arise in assessing the extent of, and change in, income inequality and poverty across countries. 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.<sup>12</sup>

<sup>12</sup> Among others, see Atkinson (1970, 1979, 1987 and 2003), Champernowne (1974), Kakwani (1977b), Hagenaaers & De Vos (1987), Coulter (1989), Atkinson et al (1995), Behrendt (2000), Gottschalk & Smeeding (1997 and 2000), Marcus & Danziger (2000), Atkinson & Brandolini (2001 and 2006), Caminada & Goudswaard (2001), Förster & Pearson (2002), Smeeding (2005 and 2008), Förster & Mira d'Ercole (2005), OECD (2008, 2011 and 2015), Caminada et al (2012a), Wang et al (2012 and 2014) and (other) papers listed in our reference section using data from the Luxembourg Income Study. Recent comprehensive reviews on methodological assumptions underlying international levels and trends in inequality are found in Brandolini & Smeeding (2007a and 2009).

### 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 equivalised household disposable income in the total population. Households are classified as poor or non-poor on the basis of whether their equivalised household disposable income is lower or higher than the relative line. In our dataset, we use three poverty lines, which are equal to 60, 50 and 40 percent of the median equivalised household disposable income. For each of the poverty lines, we calculate two kinds of poverty indices which are expressed as follows (Foster et al, 1984):

$$FGT(\lambda) = \sum_{i=1}^n f_i * I_i * \left[ \frac{z_i - y_i}{z_i} \right]^\lambda, \text{ for } \lambda = 0, 1, 2 \quad (1)$$

where  $I_i = 1$  if  $y_i < z_i$  and  $I_i = 0$  otherwise.  $n$  denotes number of individuals and  $f_i$  is the average weight of individual.  $y_i$  presents income of individual and  $z_i$  is the poverty line.  $FGT(0)$  is the headcount ratio (the proportion poor);  $FGT(1)$  is the average normalized poverty gap;  $FGT(2)$  is the average squared normalized poverty gap (however, we do not incorporate  $FGT(2)$  in our calculations). The larger  $\lambda$  is, the greater the degree of ‘poverty aversion’ (sensitivity to larger poverty gaps). For each case of the poverty indices, we set the poverty threshold at 60, 50 and 40 percent of median equivalised household disposable income. In addition to total population, we will present the results of the poverty indices and decompositions for several age-groups: the working-age population, the children and the elderly.

Income can be measured with or without transfers and/or income taxes.

$$y_i = y_i^{pri} + \alpha B_i - \beta T_i, i = 1, 2, \dots, n, \alpha, \beta \in \{0, 1\} \quad (2)$$

$y_i^{pri}$ ,  $B_i$  and  $T_i$  denote primary or market income of individual  $i$ , total transfers of individual  $i$  and total income taxes of individual  $i$ , respectively. Depending on  $\alpha$  and  $\beta$ , individual income is determined by the sum of all cash incomes, such as wages and salaries, social security transfers, private transfers and so on, where we focus on social transfers and direct income taxes. When  $\alpha = 0$  and  $\beta = 0$ , the resulting income measure presents income before transfers and income taxes (primary or market income); if  $\alpha = 1$  and  $\beta = 1$ , the measure corresponds to income after transfers and income taxes (disposable income). For  $\alpha = 1$  and  $\beta = 0$ , income represents income after transfers, but before income taxes (gross income). If  $\alpha = 0$  and  $\beta = 1$  the measure shows the income after income taxes but before transfers.

In a more general expression, individual income can be shown as formula (3), consisting of primary or market income,  $m$  kinds of transfers and  $p$  types of income taxes.  $B_{ik}$  show the  $k^{th}$  transfer of individual  $i$ , and  $T_{il}$  presents the  $l^{th}$  tax of individual  $i$ . When  $\alpha_k = 1$ ,  $\alpha_{-k} = 0$  ( $\alpha_j = 0$  ( $j \neq k$ )) and  $\beta_l = 0$ , individual income includes primary income plus the  $k^{th}$  transfer; when  $\alpha_k = 1$ ,  $\beta_l = 1$  and  $\beta_{-l} = 0$  ( $\beta_q = 0$  ( $q \neq l$ )), individual income contains primary or market income plus all the transfers and the  $l^{th}$  tax, we explain why we choose this order later.

$$y_i = y_i^{pri} + \sum_{k=1}^m \alpha_k B_{ik} - \sum_{l=1}^p \beta_l T_{il}, \quad (3)$$

$$i = 1, 2, \dots, n, k = 1, 2, \dots, m, l = 1, 2, \dots, p, \alpha_k, \beta_l \in \{0, 1\}$$

This 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 primary 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 using this formula.

We take a budget incidence approach to measure the redistributive effect of the welfare state, and we focus on the redistribution between individuals or households at one moment in time (not over the lifecycle). We apply the Reynolds-Smolensky (1977a and 1977b) measure of the redistributive impact of transfers and income taxes to present the reduction in poverty from primary income (pri) to disposable income (dhi). The antipoverty effect  $LP$  can be expressed as (c.f. Creedy & Ven, 2001):

$$LP = FGT_{pri} - FGT_{dhi} \quad (4)$$

$$LP_B = FGT_{pri} - FGT_{pri+B} \quad (5)$$

$$LP_T = FGT_{pri+B} - FGT_{dhi} \quad (6)$$

$$LP_{Bk} = ((FGT_{pri} - FGT_{pri+Bk}) + (FGT_{gross-Bk} - FGT_{gross}))/2 \quad (7)$$

$LP$ ,  $LP_B$ ,  $LP_T$ ,  $LP_{Bk}$  represent the overall poverty reduction, the poverty reduction effect of transfers, the poverty reduction effect of income taxes and the partial effect of a specific kind of transfer  $B_k$ . Consequently, the decomposition in formula (5) and (6) will offer us a quantitative measure for overall poverty reduction by social transfers and income taxes while the decomposition in formula (7) will offer us a quantitative measure for poverty reduction by specific benefit programs in a country.

It should be noted that the results to be obtained 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; see equation (7). The partial effects of these transfers in total antipoverty effect could be computed in several orders. We consider every specific social transfer as the first program to be added to primary income distribution and then the last program following all other transfers. Consequently, the antipoverty effect from every specific social transfer is the average of the two effects.

In order to assess the partial effects of specific transfer benefits and income taxes on income poverty we apply a sequential decomposition technique. 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 (primary 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 primary income. This approach has been, among others, advocated by Kakwani (1986).

Our sequential decomposition approach of income poverty follows studies by Jesuit & Mahler (2004 and 2017), Mahler & Jesuit (2006), Kristjánsson (2011) and Kammer et al (2012) with



poverty indices accounted sequentially in order to determine the effective distributional impact of different income sources.

### *3.4 Choice of income unit*

The unit of analysis is an important issue in income distribution studies. It is evident that the ultimate source of concern is the welfare of the individual. However, an individual is often not the appropriate unit of analysis. E.g. children and spouses working at home do not have recorded income, but may nevertheless be enjoying a high standard of living as a result of income sharing with parents/spouses. How to solve the problem of the key question of the unit of analysis?

Traditionally, studies have used household income per capita to adjust total incomes according to the number of persons in the household. In the last decades, equivalence scales have been widely used in the literature on income distribution and poverty (Figini, 1998). An equivalence scale is a function that calculates adjusted income from income and a vector of household characteristics.

The general form is given by the following expression:  $W = \frac{D}{S^E}$ , where  $W$  is adjusted income,  $D$  is income (disposable income),  $S$  is size (number of persons in households) and  $E$  is equivalence elasticity.  $E$  varies between 0 and 1. The larger  $E$ , the smaller are the economies of scale assumed by the equivalence scales. Equivalence scales range from  $E=0$  (no adjustment or full economies of scale) to  $E=1$  (zero economies of scale). Between these extremes, the range of values used in different studies is very large, strongly affecting measured inequality and poverty.

Equivalence scale elasticity for the LIS database is set around 0.5. This implies that in order to have an equivalent income of a household of one person where  $D$  is 100, a household of two persons must have an income of 140 to have equivalent incomes. Alternatively, a one-person household must have 70 percent of the total income of a two-person household to have equivalent income. In our comparative analysis we use this equivalence scale of LIS, where  $E$  is around 0.5. However, it has been shown that the choice of equivalence scales affects international comparisons of income inequality to a wide extent. 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 (i.e., all of their income is derived from the state) 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. That is, income in the top of the distribution is cut off by ten times the median of the non-equivalized household income. Income at the bottom of the distribution is replaced by one percent of the average equivalized household income. The bottom coding is particularly relevant for households without market income. Without bottom-coding, these households would not be included in the calculation of poverty of market income. On the other hand, these households would again be present in the calculation of poverty on the basis of secondary income components as these households are entirely dependent on this. In other words, bottom-coding ensures that the calculations of the poverty rates are carried out over the same selection of households.

### *3.5 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 & Hermansen (2017). A related choice is whether pensions should be earmarked as market income or as transfers and therefore pension contributions as taxes. This choice is of vital importance for the results. Most studies conclude that the redistributive effect of transfers is much more important than the redistributive effect of taxes; see section 2. But Guillaud et al (2017) show that if pensions are categorized as market income rather than transfers, tax redistribution dominates transfer redistribution in most countries.

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).<sup>13</sup> 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. 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.<sup>14</sup> 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).

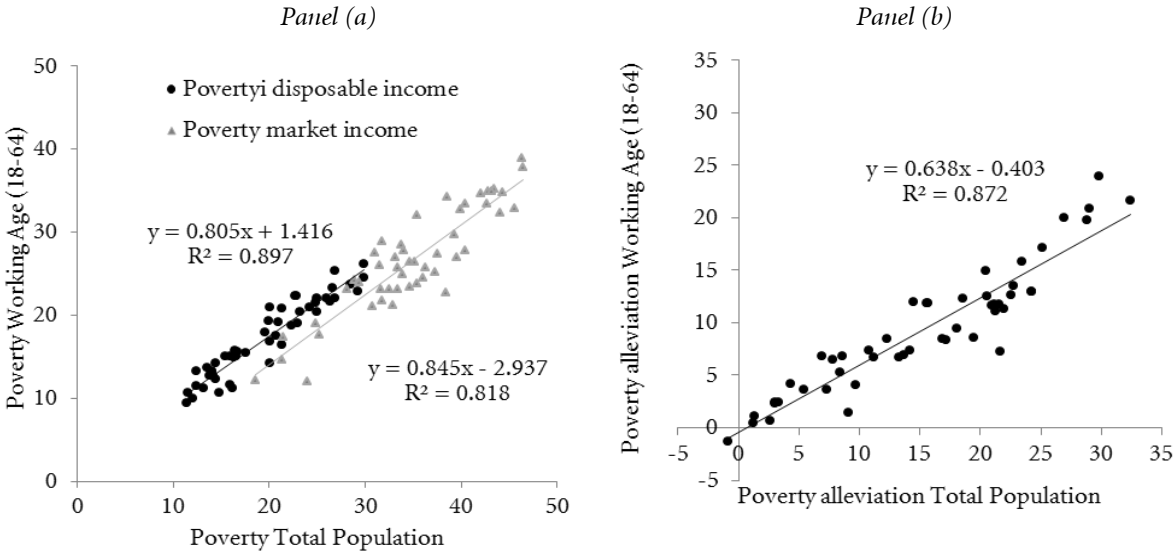
Obviously, our results will be influenced by the focus on the total population instead of non-elderly population (those aged 18-64). Poverty reduction among the total population is higher compared to poverty reduction within the working-age population. However, the correlation between poverty (and poverty reduction) of total population and poverty (and poverty reduction) of working-age population is rather high. Figure 1 (panel a) plots poverty rates of market income and disposable incomes for both population groups; panel (b) plots figures for poverty reduction for both population groups. This suggests that focusing on the total population will not give a strong bias.

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13 Tony Atkinson gave some helpful comments on the choice of different age groups. He supported our idea to take the total population into account (LIS Summer Workshop 2012). The definition of working age population is open to debate because of growing late retirement, so the range of working-age population is not easy to decide.

14 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.

**Figure 1 Linkage poverty rates total population and working-age population across 49 LIS countries** (latest data year)



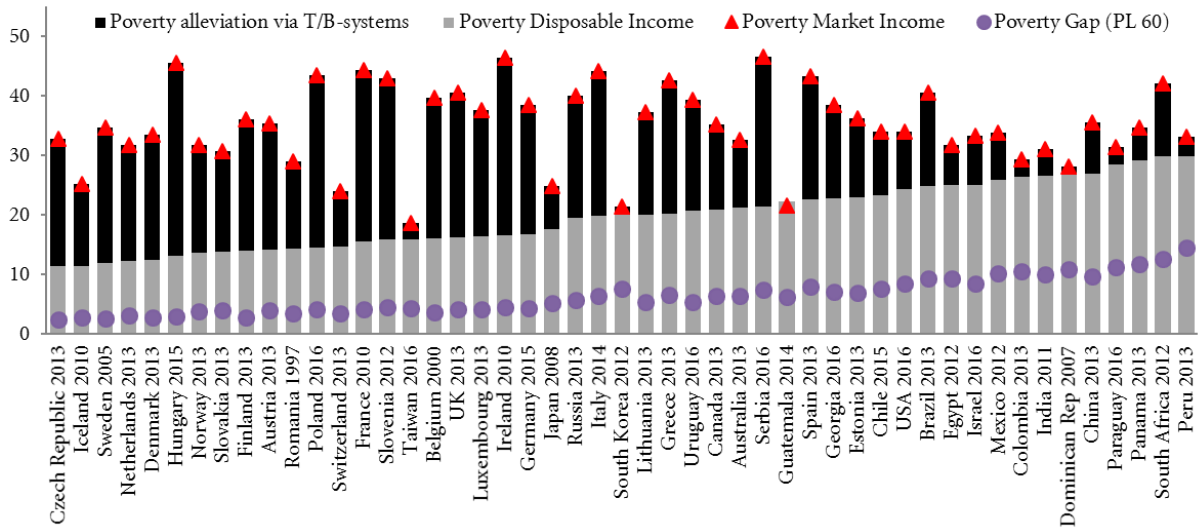
Source: Database Caminada & Wang (2018) based on LIS, and own calculations

**4. Poverty rates and antipoverty effect of T/B-systems across 49 LIS countries around 2013**

*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 2011-2013. Figure 2 shows the poverty rates and poverty gaps. Countries are listed in order of their poverty rate of disposable income from smallest to largest. The obvious advantage of the presentation of poverty by summary statistics like applying just one threshold of 60 percent of median equivalized income is its ability to summarize several nations in one picture.

**Figure 2 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: Database Caminada & Wang (2019) based on LIS, and own calculations

The lowest poverty rates and poverty gaps 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. Figure 2 indicates that a wide range of poverty levels exists across 49 LIS nations, with the nation with the highest poverty (Peru) almost three times as high as the nations with the lowest poverty (Nordic Countries).

With respect to income poverty after social transfers and taxes, there are 23 countries with poverty rates below average (19.7%). Czech Republic, Iceland, Sweden, the Netherlands, and Denmark have rather low values below 13 percent, followed by other 20 countries (Hungary, Norway, Slovakia, Finland, Austria, Romania, Poland, Switzerland, France, Slovenia, Taiwan, Belgium, the United Kingdom, Luxembourg, Ireland, Germany, Japan, Russia, Italy and South Korea) with poverty rates between 13 and 20 percent. Above average poverty is found in 24 countries (Lithuania, Greece, Uruguay, Canada, Australia, Serbia, Guatemala, Spain, Georgia, Estonia, Chile, the United States, Brazil, Egypt, Israel, Mexico, Colombia, India, Dominican Republic, China, Paraguay, Panama, South Africa, and Peru)

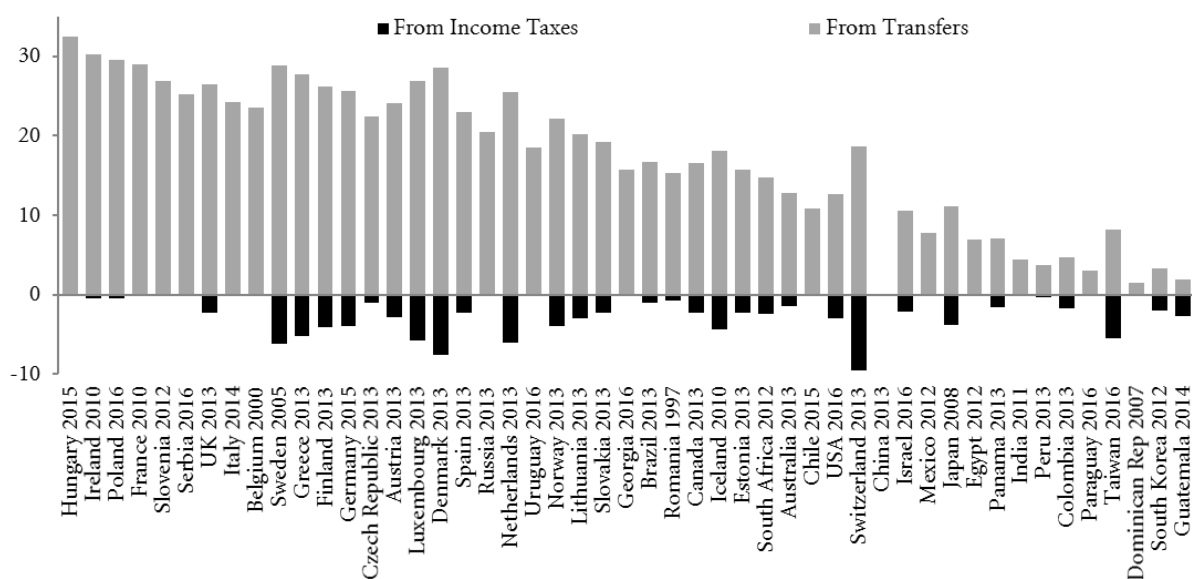
The pattern of market income poverty (before social transfers and taxes) is quite different from disposable income poverty. Serbia, Ireland and Hungary have the highest level of market income poverty, with values above 45 percent. Taiwan, South Korea, Guatemala and Switzerland have rather low levels 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. This cross country difference in the poverty alleviation via T/B-systems will be analyzed in section 4.2.

#### 4.2 The antipoverty effect of social transfers and income taxes

Figure 3 shows which share of the total population is lifted above the poverty threshold (PL60) via T/B-systems; on average 15.3 percent of the total population. Social transfers alleviate poverty, while income taxes increase poverty as a rule. Countries are listed in order of their total antipoverty effect from largest to smallest. On average, social transfers play a major role of 17.7 percent points in lifting people above the poverty threshold, while taxes (income taxes and mandatory payroll taxes) account for a negative effect of 2.3 percent points. Besides Switzerland, only in a few countries taxes are important: Greece, Taiwan, Luxembourg, Netherlands, Sweden and Denmark. For some countries, such as Belgium, Chili, Egypt, Georgia, Hungary, India, Italy, Mexico, Russia, Paraguay, Serbia, Slovenia and Uruguay, data of taxes are not available in the dataset.

**Figure 3 Antipoverty effect of social transfers and income taxes across 49 LIS countries**



Notes: See below Figure 2

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

#### 4.3 Redistribution, budget size and targeting

In section 2 we have distinguished between programs' size and the extent to which they are targeted toward low-income groups by means-testing. With this background in mind, it is useful to explore empirically these two aspects of transfers with reference to the LIS database. Is poverty alleviation associated with transfers' overall size or with their target efficiency? Is there, as is often suggested, a tradeoff between the two? Using LIS micro data it is possible to calculate a measure of the average value of social transfers as a percentage of households' pre-tax income (gross income): the larger the value, the greater the share of total income that derives from transfers. It is also possible to calculate a summary index of the degree to which transfers are targeted toward low-income groups. This is done by applying Kakwani's (1986) 'index of concentration' to transfers. This index takes on the value of -1.0 if the poorest person gets all transfer income, 0 if everybody gets an equal amount, and +1.0 if the richest person gets all transfer income (cf. Korpi & Palme, 1998: 684). Figures for the size and target efficiency of social benefits are calculated for all countries and are reported in Table 3 and Figure 4.

**Table 3 Lifted out of poverty via T/B-system** (latest data year)

LIS Dataset – gross or net		Poverty (PL60)		Lifted out of poverty			Budget size (transfers)	Efficiency / targeting
		Market income	Disposable income	T/B-system	From transfers	From Taxes		
Australia 2013	Gross	32.5	21.3	11.2	12.7	-1.5	0.127	-0.279
Austria 2013	Gross	35.4	14.2	21.2	24.1	-2.8	0.261	0.045
<i>Belgium 2000</i>	<i>Net</i>	<i>39.6</i>	<i>16.1</i>	<i>23.5</i>	<i>23.5</i>		<i>0.245</i>	<i>-0.165</i>
Brazil 2013	Gross	40.5	24.9	15.6	16.7	-1.1	0.204	0.158
Canada 2013	Gross	35.1	21.0	14.2	16.5	-2.3	0.182	-0.045
<i>Chile 2015</i>	<i>Net</i>	<i>34.0</i>	<i>23.2</i>	<i>10.8</i>	<i>10.8</i>		<i>0.110</i>	<i>-0.055</i>
China 2013	Gross	35.5	26.9	8.6				
Colombia 2013	Mix	29.4	26.3	3.0	4.8	-1.7	0.112	0.250
Czech Republic 2013	Gross	32.9	11.3	21.5	22.5	-1.0	0.205	-0.198
Denmark 2013	Gross	33.4	12.4	21.0	28.5	-7.5	0.236	-0.199
Dominican Rep 2007	Gross	28.1	26.8	1.3	1.5	-0.2	0.028	0.026
<i>Egypt 2012</i>	<i>Net</i>	<i>31.8</i>	<i>24.9</i>	<i>6.9</i>	<i>6.9</i>		<i>0.097</i>	<i>-0.040</i>
Estonia 2013	Gross	36.3	23.0	13.3	15.7	-2.4	0.191	0.022
Finland 2013	Gross	36.0	14.0	22.0	26.1	-4.1	0.255	-0.033
France 2010	Mix	44.3	15.5	28.8	29.0	-0.2	0.291	0.082
<i>Georgia 2016</i>	<i>Net</i>	<i>38.5</i>	<i>22.9</i>	<i>15.6</i>	<i>15.6</i>		<i>0.142</i>	<i>-0.045</i>
Germany 2015	Gross	38.4	16.7	21.7	25.7	-4.0	0.224	-0.113
Greece 2013	Gross	42.7	20.1	22.5	27.8	-5.2	0.296	0.172
Guatemala 2014	Gross	21.5	22.3	-0.8	1.9	-2.7	0.028	-0.039
<i>Hungary 2015</i>	<i>Net</i>	<i>45.6</i>	<i>13.1</i>	<i>32.4</i>	<i>32.4</i>		<i>0.318</i>	<i>0.012</i>
Iceland 2010	Gross	25.2	11.5	13.7	18.1	-4.4	0.164	-0.125
<i>India 2011</i>	<i>Net</i>	<i>31.0</i>	<i>26.6</i>	<i>4.3</i>	<i>4.3</i>		<i>0.069</i>	<i>0.130</i>
Ireland 2010	Gross	46.4	16.6	29.8	30.2	-0.4	0.268	-0.087
Israel 2016	Gross	33.4	25.0	8.4	10.6	-2.2	0.140	-0.033
<i>Italy 2014</i>	<i>Net</i>	<i>44.1</i>	<i>19.9</i>	<i>24.2</i>	<i>24.2</i>		<i>0.300</i>	<i>-0.004</i>
Japan 2008	Gross	24.9	17.6	7.3	11.1	-3.8	0.149	-0.036
Lithuania 2013	Gross	37.3	20.1	17.2	20.1	-3.0	0.205	-0.058
Luxembourg 2013	Gross	37.6	16.4	21.1	26.8	-5.7	0.260	0.106
<i>Mexico 2012</i>	<i>Net</i>	<i>33.7</i>	<i>26.0</i>	<i>7.8</i>	<i>7.8</i>		<i>0.113</i>	<i>0.022</i>
Netherlands 2013	Gross	31.8	12.4	19.5	25.5	-6.1	0.222	-0.117
Norway 2013	Gross	31.7	13.6	18.1	22.1	-4.0	0.232	-0.064
Panama 2013	Gross	34.6	29.2	5.4	7.0	-1.6	0.116	0.111
<i>Paraguay 2016</i>	<i>Net</i>	<i>31.5</i>	<i>28.5</i>	<i>3.0</i>	<i>3.0</i>		<i>0.050</i>	<i>-0.116</i>
Peru 2013	Gross	33.2	29.9	3.3	3.7	-0.4	0.073	0.131
Poland 2016	Mix	43.5	14.5	29.0	29.5	-0.5	0.281	0.018
Romania 1997	Gross	28.9	14.4	14.5	15.3	-0.8	0.153	-0.021
<i>Russia 2013</i>	<i>Net</i>	<i>40.0</i>	<i>19.5</i>	<i>20.5</i>	<i>20.5</i>		<i>0.222</i>	<i>0.055</i>
<i>Serbia 2016</i>	<i>Net</i>	<i>46.5</i>	<i>21.4</i>	<i>25.2</i>	<i>25.2</i>		<i>0.306</i>	<i>0.151</i>
Slovakia 2013	Gross	30.7	13.8	16.9	19.2	-2.3	0.209	-0.108
<i>Slovenia 2012</i>	<i>Net</i>	<i>42.9</i>	<i>15.9</i>	<i>26.9</i>	<i>26.9</i>		<i>0.282</i>	<i>0.002</i>
South Africa 2012	Gross	42.1	29.8	12.3	14.7	-2.5	0.106	0.193
South Korea 2012	Gross	21.3	20.1	1.3	3.3	-2.1	0.046	0.050
Spain 2013	Gross	43.3	22.7	20.6	22.9	-2.4	0.263	0.153
Sweden 2005	Gross	34.7	12.0	22.7	28.9	-6.2	0.281	-0.074
Switzerland 2013	Gross	23.9	14.8	9.1	18.7	-9.5	0.172	-0.144
Taiwan 2016	Gross	18.6	16.0	2.7	8.1	-5.5	0.106	0.066
UK 2013	Gross	40.5	16.3	24.2	26.5	-2.3	0.217	-0.123
<i>Uruguay 2016</i>	<i>Net</i>	<i>39.3</i>	<i>20.7</i>	<i>18.5</i>	<i>18.5</i>		<i>0.203</i>	<i>0.065</i>
USA 2016	Gross	33.9	24.3	9.7	12.6	-3.0	0.132	-0.098
Mean LIS-49		35.1	19.7	15.3	17.7	-2.3	0.185	-0.008

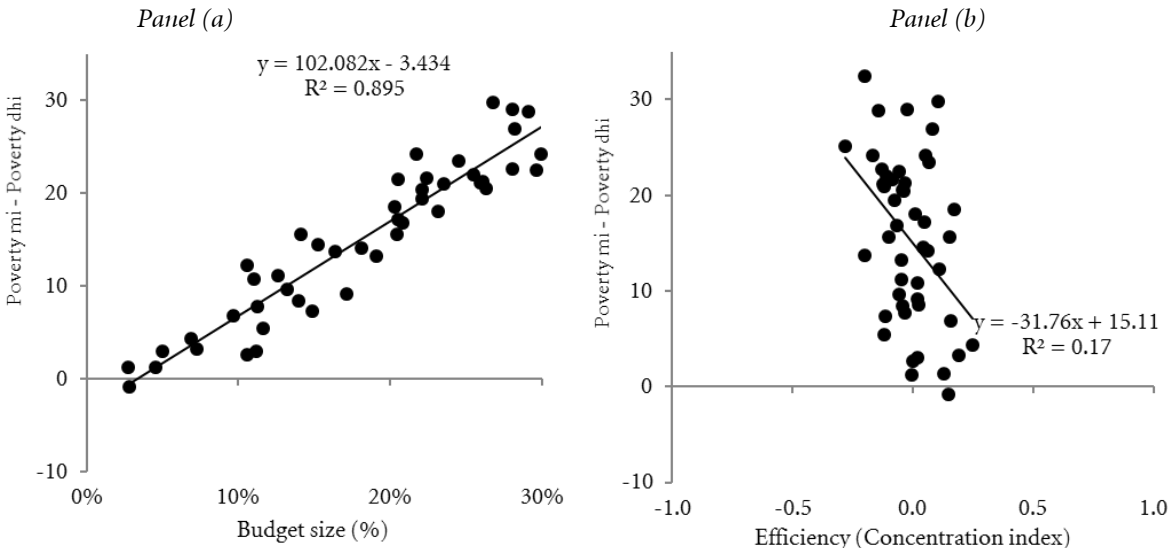
- For Norway 2013, private transfers are not available; we calculate all incomes without adding private transfers.
- Gross income data for most countries, while income data net of income taxes for other countries (*marked italic*).

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

As is shown, there is indeed considerable variance among developed countries in the average size of social benefits relative to total household income, ranging from 2.8% to 31.8%. Some LIS countries (Hungary, Serbia, Italy, Greece and France) achieve the highest budget size of transfers (above 29%), followed by twenty countries with values between 20% and 29%, while seven countries have the lowest level (less than 10%). The budget size of the Unites States is far below-average (13% versus 18.5%).

As for target efficiency, it is more diverse across countries. France and Greece have rather high budget size of transfers (29-30%) with transfer programs being slightly regressive in terms of the Kakwani index. Spain, Luxembourg, France and Poland have low target efficiency, but high social expenditures (above 25%). Australia and Switzerland show high figures for transfer targeting although with a modest redistributive budget size (less than 18%). The United States not only has a rather low budget size, but also a quite low target efficiency. Interestingly, Australia, at the bottom of our list of budget size (13%), achieves the highest target efficiency among rich countries.

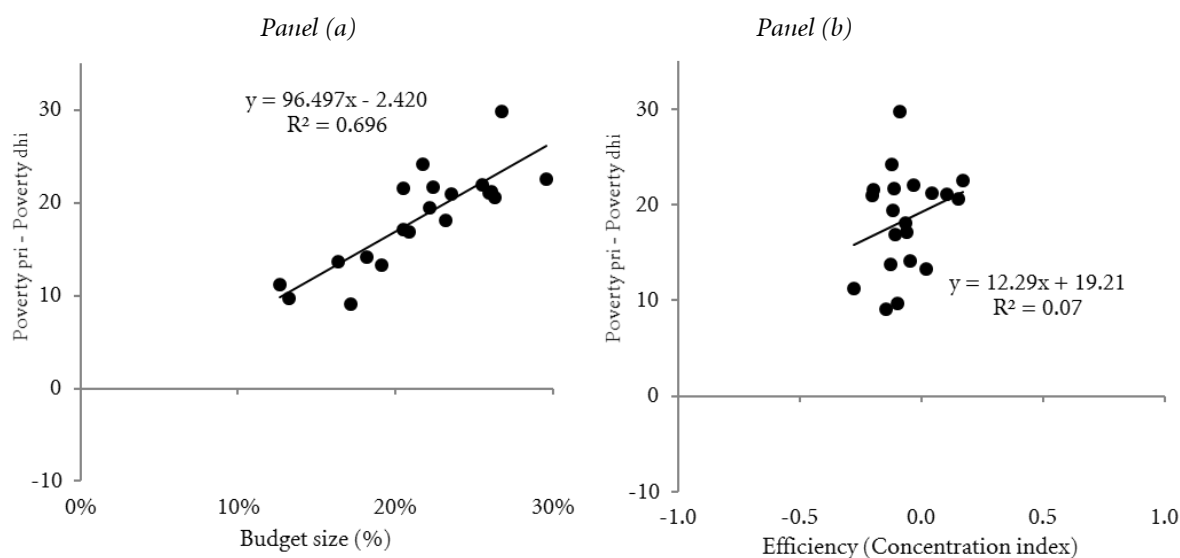
**Figure 4 Poverty alleviation, budget size and targeting across 49 LIS countries** (latest data year)



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

The budget size of transfers plays a very important role in overall poverty alleviation, which is confirmed by a simple regression analysis in Figure 4 Panel (a). The estimated coefficient of the budget size is positive and statistically significant. Target efficiency is negatively associated with poverty alleviation, although the linkage is weak (see Panel (b)). This is in line with the claim of Korpi & Palme (1998) that greater use of transfer targeting yields less redistribution. However, when we restrict our analysis to the twenty wealthiest countries of LIS with full tax/benefit information, the correlations with target efficiency disappears. Poverty alleviation across these countries does *not* correlate with the target efficiency. This result is in line with Kenworthy (2011: Chapter 6, page 2-4).

**Figure 5 Poverty alleviation, budget size and targeting across rich countries** (latest data year)



Selected LIS-countries: Australia, Austria, Canada, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Iceland, Ireland, Lithuania, Luxembourg, the Netherlands, Norway, Slovakia, Spain, Switzerland, the United Kingdom, and the United States.

Source: Database Wang & Caminada (2017) based on LIS, and own calculations

#### 4.4 Sensitivity analysis

##### *Different poverty lines*

For purposes of international comparisons, poverty is almost always a relative concept. A majority of cross-national studies define the poverty threshold as one-half of national median income. In this study, we use the 60 percent of median income as a standard to establish national poverty lines. In order to offer a broader picture of the antipoverty effect of income transfers, we employed not only the threshold of 60 percent of median equivalized income, but also thresholds of 40 and 50 percent. While the threshold of 60 percent is the official agreed-upon poverty line for countries within the European Union, 40 percent of median equivalized income is closer to the ratio of the official US poverty line to median US household (pre-tax) cash income.<sup>15</sup>

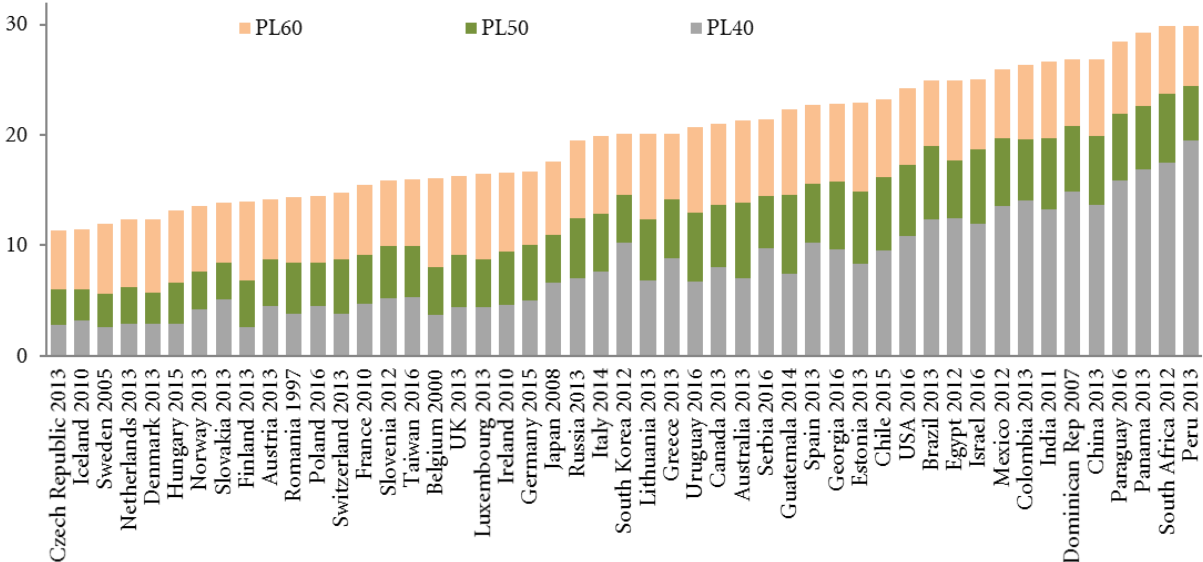
We performed a sensitivity analysis for all waves of the 49 LIS-countries; see *Documentation Guide LLBIFR Dataset on Relative Income Poverty 2019*. In Figure 6 countries are again listed in order of the level of their poverty rate of disposable income around 2012 from smallest to largest when a poverty line of 60 is applied. We find that all poverty lines (PL60, PL50, P40) follow more or less the same pattern. The lowest poverty rates are shown when a threshold of 40 percent is applied, while higher figures are found via higher thresholds (respectively 50 or 60 percent of median equivalized disposable income). Note that the country ranking will change only slightly when a threshold of 40 percent instead of 60 percent is applied, although there are some exceptions. For example, Finland climbs 8 places to a top ranking showing lowest income poverty when a threshold of 40 percent is applied. Also other countries climb considerably, including Belgium (9 places), the United Kingdom and Luxembourg (both 6 places), while for example Slovakia and South Korea descend noticeably on the country ranking list (both fall 11 places).

<sup>15</sup> Following Smeeding et al (2009) 35 percent in 1997 and below 30 percent of median since 2000.



But in most cases empirical results will hardly be affected by applying a 60 instead of a 40 or 50 percent poverty line.

**Figure 6 Relative poverty rates of disposable income for different poverty lines across 49 LIS countries** (latest data year)

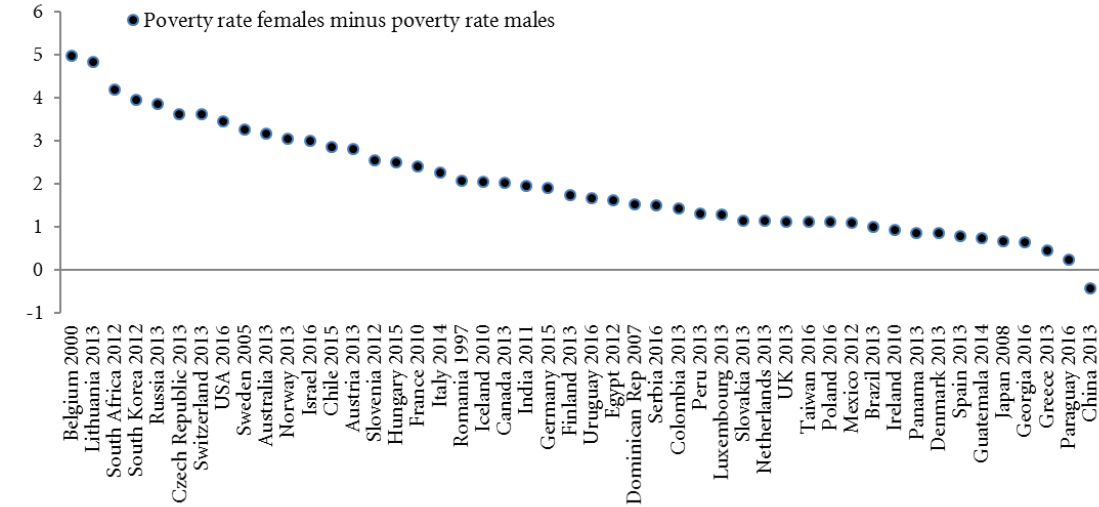


Source: Database Wang & Caminada (2017) based on LIS, and own calculations

*Gender*

Figure 7 shows the differences in poverty rates between females and males. As a rule of thumb poverty among females is higher compare to males in all countries, with China as an exception. In some countries the difference exceeds 4 percent points and over (Estonia, Belgium, Lithuania, South Africa and South Korea), while in other countries the difference of poverty between males and females lies within a bandwidth of 1 percent point (Ireland, Panama, Denmark, Spain, Guatemala, Japan, Georgia, Greece and Paraguay).

**Figure 7 Gender effect of poverty rates (PL60) of disposable income across 49 LIS countries**



Source: Database Wang & Caminada (2017) based on LIS, and own calculations

### *Data source*

Our analysis is based on the Luxembourg Income Study database. Also the OECD Income Distribution and Poverty database is frequently used for comparative analyses (e.g. OECD, 2015, and Thewissen et al, 2015). Detailed information is provided on the relevant websites. The LIS database allows users to access the microdata to derive consistent inequality measures and poverty rates from the underlying data at the individual and household level. The OECD database contains such variables based on a standardized questionnaire sent to member countries and filled out by them from national surveys. LIS has assembled data for most of the countries it covers in 'waves' for occasional years around 1975, 1980, 1985 and so on, at approximately 5-year intervals, whilst the OECD database has sought to include annual data for more recent years. LIS allows one to go back as far as around 1980 for rather more countries than the OECD database, but OECD has information on New Zealand, Portugal, and more than one year of information for Japan. Especially the coverage of the poverty rate of market income before the year 2004 is rather low in the OECD database: only twelve countries are well covered (Canada, Denmark, Finland, Germany, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Sweden and the United Kingdom).

Table 4 compares relative income poverty rates with a threshold of PL60 (before and after social transfers and taxes) for around the year 2013 from the OECD database with figures from LIS (2013), which are completely in line with our calculations. The 28 countries listed are included adopted in both the OECD-database and the LIS-database around 2013. Note that disposable income poverty data across countries of OECD-data and LIS-data are highly correlated (around 0.947). Correlation coefficients for market income poverty and for poverty alleviation are somewhat lower (resp. 0.825 to 0.868). Compared to LIS, the OECD presents higher figures for market poverty for 23 out of 28 countries. For most countries the difference in market income poverty from OECD and from LIS do not exceed 5 percent points, with exceptions for Poland, Chili, Slovenia, Russia, Italy, Denmark, Switzerland, Israel and the United Kingdom. What could explain these differences?

First and foremost, it is because the difference between income surveys. LIS micro data are predicated on different surveys across countries. From those surveys, LIS staff refined and formalized rules used to classify variables, offering a comparable micro dataset. Computations in the OECD dataset are based on the OECD income distribution questionnaires. Therefore, the sample of surveys is not the same, leading to different values of income poverty and the redistributive effects of taxes and transfers. Moreover, the OECD applies a new income definition since 2011. Data is calculated according to the new OECD Terms of reference. Compared to previous terms of reference, these include a more detailed breakdown of current transfers received and paid by households as well as a revised definition of household income, including the value of goods produced for own consumption as an element of self-employed income.

A second explanation for the diverging results is the difference in the definition of market income, and the way income poverty before transfers and taxes is measured. Using LIS data, market income equals to primary income, which is considered as the sum of labor income, capital income and private transfers. With respect to pre-government income poverty using OECD data, market income adds to primary income the value of employment-related social insurance transfers received by households. Consequently, the level of income disparity and overall redistributive effect differs when data is used from the LIS dataset and from the OECD dataset.

**Table 4 OECD versus LIS: Relative income poverty and poverty reduction across countries**

	<i>LIS around 2013 (PL60, total population)</i>				<i>OECD around 2013 (PL60, total population)</i>			
	Data year	Poverty market income	Poverty disposable income	Poverty reduction	Data year	Poverty market income	Poverty disposable income	Poverty reduction
Australia	2013	32.5	21.3	11.2	2014	30.3	20.9	9.4
Canada	2013	35.1	21.0	14.2	2013	30.5	20.7	9.8
Chili	2013	34.0	23.2	10.8	2013	24.6	23.8	0.8
China	2013	35.5	26.9	8.6	2011	39.2	33.1	6.1
Czech Republic	2013	32.9	11.3	21.5	2013	32.7	11.1	21.6
Denmark	2013	33.4	12.4	21.0	2010	27.0	13.2	13.8
Estonia	2013	36.3	23.0	13.3	2013	37.2	23.5	13.7
Finland	2013	36.0	14.0	22.0	2012	35.3	13.7	21.6
France	2010	44.3	15.5	28.8	2011	39.8	14.5	25.3
Germany	2015	38.4	16.7	21.7	2014	36.3	15.6	20.7
Greece	2013	42.7	20.1	22.5	2013	41.7	20.9	20.8
Iceland	2010	25.2	11.5	13.7	2010	25.2	10.7	14.5
Ireland	2010	46.4	16.6	29.8	2010	47.3	15.6	31.7
Israel	2016	33.4	25.0	8.4	2015	28.3	24.4	3.9
Italy	2014	44.1	19.9	24.2	2013	37.6	19.3	18.3
Lithuania	2013	37.3	20.1	17.2	2013	37.3	20.0	17.3
Luxembourg	2013	37.6	16.4	21.1	2013	37.1	15.6	21.5
Mexico	2012	33.7	26.0	7.8	2012	33.2	27.6	5.6
Netherlands	2013	31.8	12.4	19.5	2012	29.8	13.8	16.0
Norway	2013	31.7	13.6	18.1	2011	27.0	13.3	13.7
Poland	2016	43.5	14.5	29.0	2015	32.9	18.0	14.9
Russia	2013	40.0	19.5	20.5	2010	32.4	21.6	10.8
Slovak Republic	2013	30.7	13.8	16.9	2013	33.4	17.5	15.9
Slovenia	2012	42.9	15.9	26.9	2012	34.2	15.6	18.6
South Korea	2012	21.3	20.1	1.3	2012	21.4	20.1	1.3
Switzerland	2013	23.9	14.8	9.1	2011	18.6	16.3	2.3
United Kingdom	2013	40.5	16.3	24.2	2010	35.4	17.2	18.2
United States	2016	33.9	24.3	9.6	2015	31.0	23.6	7.4
Mean (28 common countries)	2013	35.7	18.1	17.6	2012	32.7	18.6	14.1

Source: OECD (data extracted 1 October 2018 from OECD.Stat) and Database Caminada & Wang (2019)

Although the way of measuring income poverty differs to some extent in the LIS-dataset and the OECD-dataset, the general pictures from both datasets are the same. Table 5 ranks 28 common countries in LIS-data and OECD-data from low to high for all data variables around 2013. The smallest disposable income poverty exists in Czech Republic, Iceland, Netherlands, Denmark, Norway and Finland, while the largest values are found for Estonia, Chili, the United States, Israel, Mexico and China, independent of the data source used. With respect to poverty reduction by social transfers and income taxes, France and Ireland achieve the highest level, while South Korea, Mexico, Israel, China, Switzerland, the United States, Chili and Australia show the lowest values, again independent of the source used. Both data sets rank South Korea and Switzerland highest on the list for the lowest market income poverty. The largest value for relative market income poverty is found for Ireland.

**Table 5 Ranking of common countries in LIS and OECD dataset**

	<i>Poverty total population (PL60) market income</i>		<i>Poverty total population (PL60) disposable income</i>		<i>Poverty reduction vi T/B-systems</i>	
	LIS	OECD	LIS	OECD	LIS	OECD
1	South Korea	Switzerland	Czech Republic	Iceland	South Korea	Chili
2	Switzerland	South Korea	Iceland	Czech Republic	Mexico	South Korea
3	Iceland	Chili	Netherlands	Denmark	Israel	Switzerland
4	Slovak Republic	Iceland	Denmark	Norway	China	Israel
5	Norway	Norway	Norway	Finland	Switzerland	Mexico
6	Netherlands	Denmark	Slovak Republic	Netherlands	United States	China
7	Australia	Israel	Finland	France	Chili	United States
8	Czech Republic	Netherlands	Poland	Slovenia	Australia	Australia
9	Israel	Australia	Switzerland	Luxembourg	Estonia	Canada
10	Denmark	Canada	France	Ireland	Iceland	Russia
11	Mexico	United States	Slovenia	Germany	Canada	Norway
12	United States	Russia	United Kingdom	Switzerland	Slovak Republic	Estonia
13	Chili	Czech Republic	Luxembourg	UK	Lithuania	Denmark
14	Canada	Poland	Ireland	Slovak Republic	Norway	Iceland
15	China	Mexico	Germany	Poland	Netherlands	Poland
16	Finland	Slovak Republic	Russia	Italy	Russia	Slovak Republic
17	Estonia	Slovenia	Italy	Lithuania	Denmark	Netherlands
18	Lithuania	Finland	South Korea	South Korea	Luxembourg	Lithuania
19	Luxembourg	UK	Lithuania	Canada	Czech Republic	UK
20	Germany	Germany	Greece	Greece	Germany	Italy
21	Russia	Luxembourg	Canada	Australia	Finland	Slovenia
22	United Kingdom	Estonia	Australia	Russia	Greece	Germany
23	Greece	Lithuania	Estonia	Estonia	Italy	Greece
24	Slovenia	Italy	Chili	United States	United Kingdom	Luxembourg
25	Poland	China	United States	Chili	Slovenia	Finland
26	Italy	France	Israel	Israel	France	Czech Republic
27	France	Greece	Mexico	Mexico	Poland	France
28	Ireland	Ireland	China	China	Ireland	Ireland

*Note:* Ranking by the value of poverty rates market income, poverty rates disposable income and poverty reduction, respectively, from low to high.

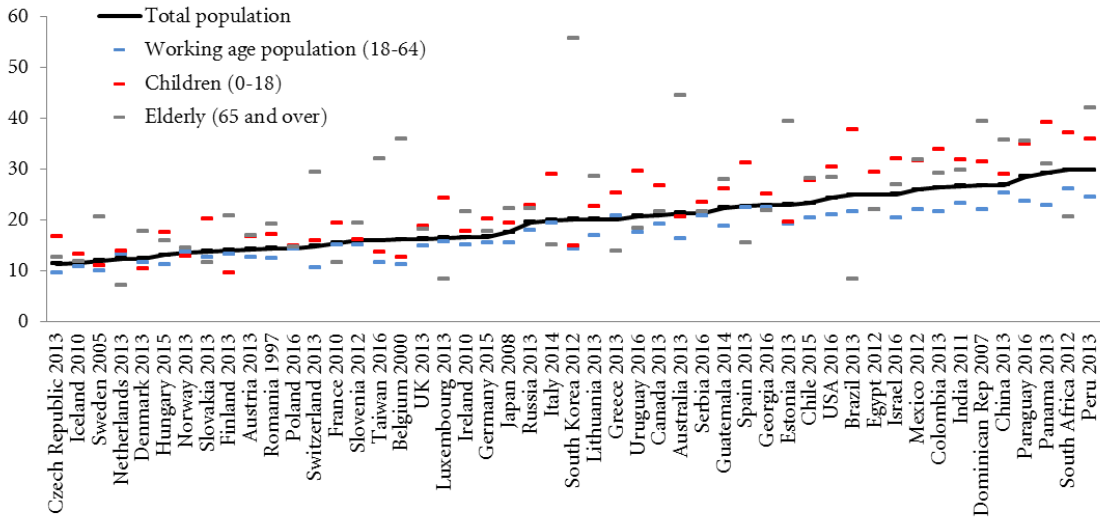
Source: OECD (data extracted 1 October 2018 from OECD.Stat) and Database Caminada & Wang (2019)

## 5 Vulnerable groups and regions

### 5.1 Decomposition of poverty by age groups

We look at two vulnerable age groups: children (0-18 years) and elderly (65 and over). Adding figures for the working-age population (18-64 year) complements all three parts of poverty among the total population (analyzed so far). Figure 8 shows poverty profiles of disposable income for children, the elderly and the working-age population based on LIS around 2013. Countries are ranked according to their poverty rate at the 60 percent of median equivalized income of the total population.

**Figure 8 Poverty rates (PL60) of disposable income across 49 LIS countries among age groups**  
(latest data year)



Source: Database Caminada & Wang (2019)

On average, across all countries displayed in Figure 8, around 23.1 percent of all children fell below the 60 percent poverty threshold. Child poverty rates are especially low in the Nordic countries, Benelux countries and Taiwan, Poland and South Korea, where fewer than 15 percent of all children are poor. Child poverty is high and above 30 percent in the United States, Spain, Dominican Republic, Mexico, India, Israel, Colombia, Paraguay, Peru, South Africa, Brazil and Panama. In most countries, relative poverty rates among children are also higher than for the entire population, but with much variation across countries. For example, in most Nordic countries, Taiwan, Estonia, Belgium and South Korea, poverty among children is even lower than that of the total population, suggesting that families with children are relatively well protected against poverty (cf. Lelkes and Zólyomi, 2008: 5). These differences suggest that specific factors increase or decrease risks of poverty for children in OECD countries (cf. Förster and Mira d'Ercole, 2005).

Traditionally, also the elderly are seen as a vulnerable group, because their economic wellbeing largely depends on the social protection system. LIS data presents a mean of disposable income poverty of 23.6 percent for all 49 countries. Across all LIS-countries, poverty among elderly is higher compared to the total population (respectively 23.6 percent and 19.7 percent). Cross-country differences are large, with relatively good figures for the Netherlands, Brazil and Luxembourg (below 10 percent). In several countries poverty among elderly exceeds 1/3: Paraguay, China, Belgium, Dominican Republic, Estonia, Peru, Australia and South Korea. To sum up, our analysis of poverty of vulnerable age-groups identifies serious holes in the safety net of several countries. In some member states the safety net offers little assistance to vulnerable groups (cf. Sainsbury and Morissens, 2002). On average, child poverty and the poverty among the elderly is a quantitatively comparable problem. But single parents and their children generally have the highest poverty rates, while those in two-parent units, mixed units, and the childless experience the least poverty (Smeeding, 2006).

## 5.2 Share of population lifted out of poverty via T/B-systems

On average 15 percent of total population is lifted out of poverty via T/B-systems around 2013; see Table 6. Huge variation exists among countries and age groups. Poverty reduction for the working-age population and children is lower (on average) with figures of respectively 9 and 8 percent. In contrast, poverty reduction via T/B-systems among elderly is much higher than for the entire population or for the working-age population or for children, but with much variation across countries. It should be stressed that the effectiveness of combating poverty among the elderly across countries is highly sensitive for the way pensions are treated. Given their weight in the disposable income of elderly people, pensions play a major role in shaping income adequacy and poverty risks for this group of the population. When pension is considered as market income, the antipoverty effect of social transfers and income taxes among elderly is rather small. However, in case pensions are earmarked as social transfers, we find high figures for the antipoverty effect of transfers (and taxes) across countries: 48 percent points on average! The best-practices for the elderly for around 2013 are found in the Netherlands, France and Luxembourg with antipoverty effects above 75 percent. On the other side, India, Dominican Republic, South Korea and Guatemala hardly lift elderly above the poverty line via their T/B-system (below 10 percent points).

Table 6 shows the antipoverty effectiveness of T/B-systems for the total population, the working-age population, the children and the elderly (latest data year). Countries are ranked according to their antipoverty effect of T/B-systems of the total population. The share of people lifted out of poverty via T/B-systems varies both across countries and age-groups. The Netherlands is a good example. This country ranks twentieth on the list of lifting total population out of poverty, but scores highest among the elderly *and* rather low for children (place 43 out of 49).

The best-practices for children are found in Ireland, Hungary, Poland and the United Kingdom with antipoverty effects of 22 percent and over. Hardly any antipoverty effect is found in Greece, the Netherlands, Dominican Republic, Japan, Guatemala, South Korea, Taiwan and Switzerland. The best-practices for the working-age population are found in Ireland, Hungary and Poland with antipoverty effects above 20 percent, while hardly any antipoverty effect is found in Switzerland, Dominican Republic, Taiwan, South Korea and Guatemala.

Overall the antipoverty effectiveness of T/B-systems for the total population is highest (over 25 percent) in Hungary, Ireland, Poland, France and Slovenia. Hardly any antipoverty effect via T/B-systems is found in Dominican Republic, South Korea and Guatemala.

**Table 6 Share of people lifted out of poverty via T/B-systems in 49 LIS countries** (latest data year)

LIS Dataset	Total population (rank)	Working-age population, 18-64 (rank)	Children 0-18 year (rank)	Elderly 65 and over (rank)
<i>Hungary 2015</i>	32 (1)	22 (2)	26 (2)	70 (5)
Ireland 2010	30 (2)	24 (1)	28 (1)	65 (18)
Poland 2016	29 (3)	21 (3)	23 (3)	70 (7)
France 2010	29 (4)	20 (5)	17 (5)	80 (2)
<i>Slovenia 2012</i>	27 (5)	20 (4)	15 (6)	65 (17)
<i>Serbia 2016</i>	25 (6)	17 (6)	13 (10)	55 (25)
UK 2013	24 (7)	13 (11)	22 (4)	68 (13)
<i>Italy 2014</i>	24 (8)	13 (10)	5 (32)	69 (8)
<i>Belgium 2000</i>	23 (9)	16 (7)	13 (8)	60 (21)
Sweden 2005	23 (10)	14 (9)	13 (9)	69 (10)
Greece 2013	23 (11)	13 (12)	1 (42)	69 (9)
Finland 2013	22 (12)	11 (21)	11 (14)	67 (14)
Germany 2015	22 (13)	7 (30)	7 (23)	70 (6)
Czech Republic 2013	22 (14)	12 (18)	6 (28)	74 (4)
Austria 2013	21 (15)	11 (22)	11 (13)	68 (11)
Luxembourg 2013	21 (16)	12 (19)	12 (12)	76 (3)
Denmark 2013	21 (17)	12 (20)	7 (26)	68 (12)
Spain 2013	21 (18)	13 (13)	6 (29)	63 (19)
<i>Russia 2013</i>	20 (19)	15 (8)	10 (17)	56 (23)
Netherlands 2013	19 (20)	9 (24)	1 (43)	84 (1)
<i>Uruguay 2016</i>	19 (21)	12 (14)	13 (11)	55 (24)
Norway 2013	18 (22)	9 (23)	8 (22)	67 (15)
Lithuania 2013	17 (23)	8 (27)	9 (19)	53 (27)
Slovakia 2013	17 (24)	8 (26)	7 (27)	66 (16)
<i>Georgia 2016</i>	16 (25)	12 (17)	11 (15)	36 (34)
Brazil 2013	16 (26)	12 (16)	9 (18)	62 (20)
Romania 1997	15 (27)	12 (15)	8 (21)	40 (32)
Canada 2013	14 (28)	7 (29)	6 (30)	54 (26)
Iceland 2010	14 (29)	7 (31)	8 (20)	58 (22)
Estonia 2013	13 (30)	7 (35)	5 (31)	43 (30)
South Africa 2012	12 (31)	9 (25)	14 (7)	42 (31)
Australia 2013	11 (32)	7 (34)	10 (16)	34 (36)
<i>Chile 2015</i>	11 (33)	7 (28)	7 (25)	35 (35)
USA 2016	10 (34)	4 (39)	4 (34)	39 (33)
Switzerland 2013	9 (35)	1 (45)	-2 (49)	50 (28)
China 2013	9 (36)	7 (33)	5 (33)	31 (37)
Israel 2016	8 (37)	5 (37)	2 (40)	45 (29)
<i>Mexico 2012</i>	8 (38)	6 (36)	7 (24)	21 (41)
Japan 2008	7 (39)	4 (41)	-1 (45)	29 (39)
<i>Egypt 2012</i>	7 (40)	7 (32)	4 (36)	31 (38)
Panama 2013	5 (41)	4 (40)	4 (37)	25 (40)
<i>India 2011</i>	4 (42)	4 (38)	4 (35)	8 (47)
Peru 2013	3 (43)	2 (42)	2 (39)	11 (45)
Colombia 2013	3 (44)	2 (43)	2 (41)	15 (42)
<i>Paraguay 2016</i>	3 (45)	2 (44)	3 (38)	12 (44)
Taiwan 2016	3 (46)	1 (47)	-2 (48)	13 (43)
Dominican Rep 2007	1 (47)	1 (46)	1 (44)	7 (48)
South Korea 2012	1 (48)	0 (48)	-1 (47)	9 (46)
Guatemala 2014	-1 (49)	-1 (49)	-1 (46)	6 (49)
Mean LIS-49	15	9	8	48

Note: Gross income data for most countries, while data net of income taxes for other countries (*marked italic*).

Source: Database Caminada & Wang (2019)

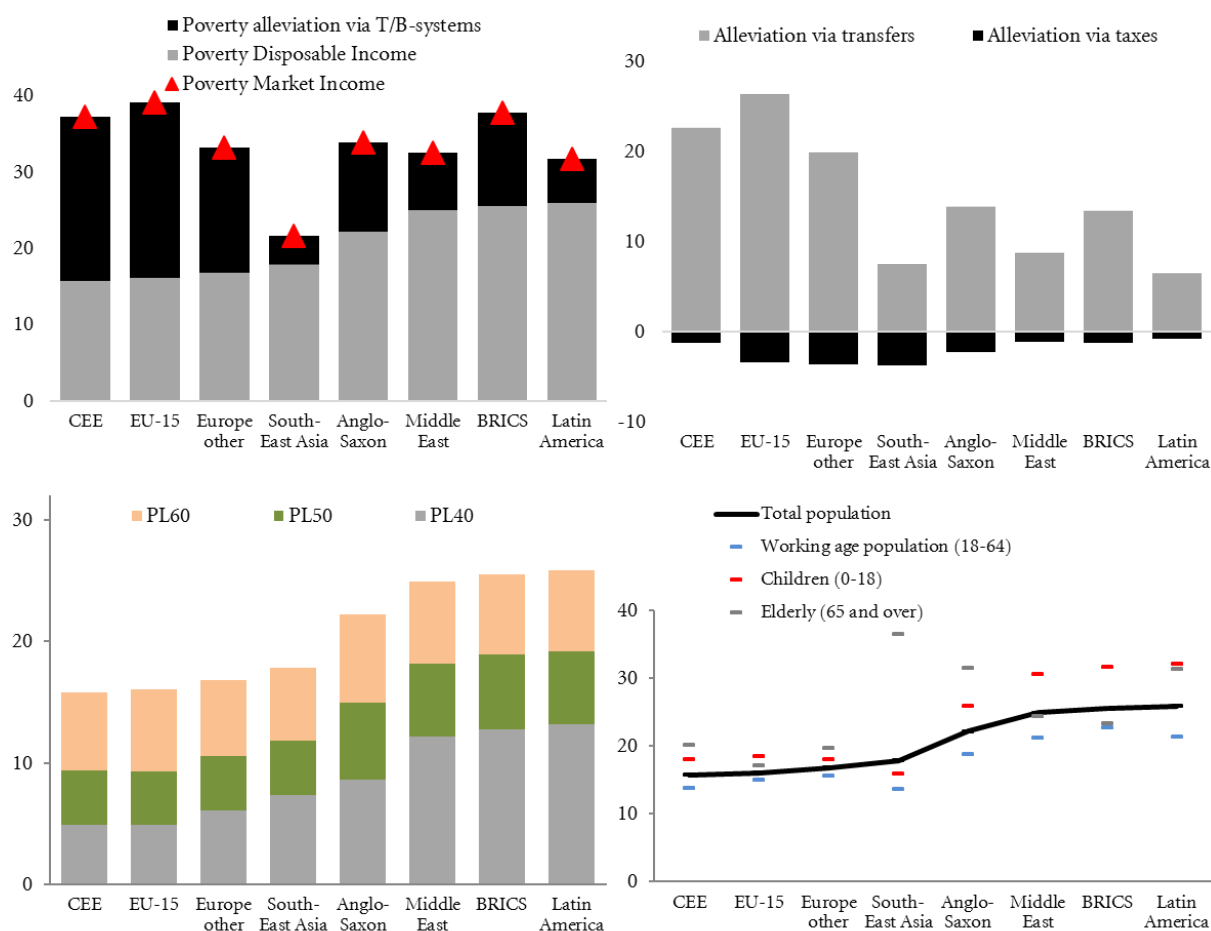
### 5.3 Regions

Both poverty and poverty alleviation variables vary per region or otherwise classified groups of countries. Somewhat arbitrary we labeled countries as follows:

- Anglo-Saxon (3): Australia, Canada and United States;
- EU15 (14): Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Spain, Sweden and United Kingdom;
- CEE (7): Czech Republic, Estonia, Hungary, Lithuania, Poland, Slovakia and Slovenia;
- Europe – other (5): Georgia, Iceland, Norway, Serbia and Switzerland;
- BRICS (5): Brazil, China, India, Russia and South Africa;
- Latin America (10): Chile, Colombia, Dominican Republic, Guatemala, Mexico, Panama, Paraguay, Peru and Uruguay;
- Middle East (2): Egypt and Israel;
- South-East Asia (3): Japan, South Korea and Taiwan.

Market income poverty is highest in EU15 countries and BRICS, and lowest in South East Asia. Disposable income poverty is highest in Middle East, BRICS and Latin America, and lowest in Europe. T/B-systems reduce poverty most in EU-15, and slightest in South East Asia and Latin America. Child poverty is highest in Latin America and BRICS, while lowest in European countries. Poverty among the elderly is highest in South East Asia and Anglo-Saxon countries.

Figure 9 Poverty rates for two income concepts, three poverty lines, for different age-groups and poverty alleviation via social transfers and income taxes across regions (latest data year)



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



## 6. Decomposition of antipoverty effects of social transfers and income taxes across LIS countries around 2013

### 6.1 Budget size per social program

This section provides detailed results of the antipoverty effect of various welfare state programs across a selection of our 49 countries based on the most recent wave of LIS. We elaborate on the work of Caminada et al (2017, 2018 and 2019). LIS data allow us to decompose the trajectory of the poverty rate from market to disposable income in several parts: we will distinguish 7 different social benefits and income taxes and social contributions in our empirical investigation across countries. We calculate the following (partial) antipoverty effects, based on formula (6) and (7) in section 3.3, and based on the LIS household income components list (see *Documentation Guide LLBIFR Dataset on Relative Income Poverty 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.

It is useful to explore empirically two aspects of social benefits: programs' size and the progressiveness of each social benefit; see section 4.3. Is poverty alleviation associated with transfers' overall size or with their target efficiency? Using LIS micro data it is possible to calculate a measure of the average value of social transfers as a percentage of households' gross income for each social program: the larger the value, the greater the share of total income that derives from transfers.

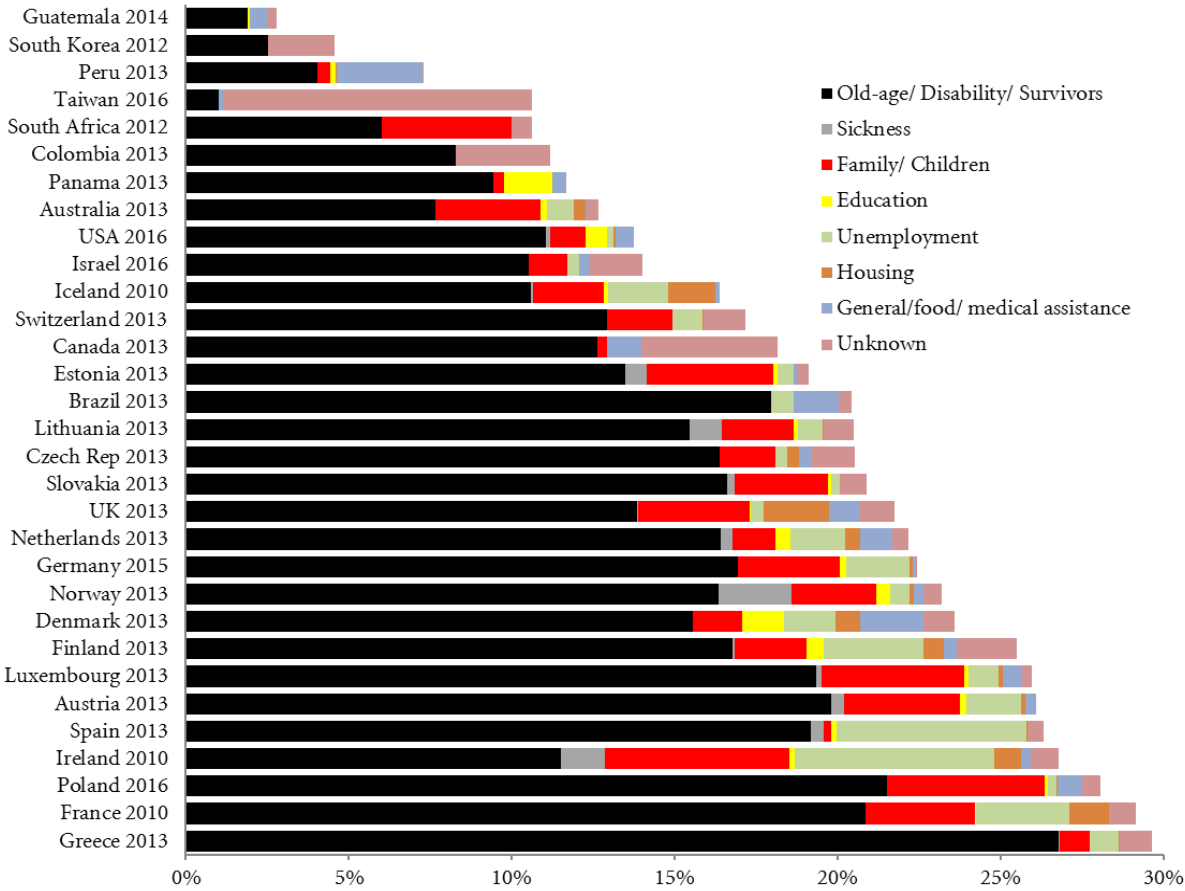
Figure 10 presents social benefits as a proportion of households' gross income for each benefit categorized in LIS. We selected 31 LIS countries for which full information is available on the whole trajectory from market income to disposable income for data year 2010 or later. Countries are listed in order of their level of budget size from largest to smallest.<sup>16</sup>

We observe a considerable variance among developed countries in the average size of social benefits relative to total household income, ranging from 2.8% (Guatemala) to 29.6% (Greece). Some countries (France and Poland) achieve the highest budget size of transfers (above 28%), followed by the majority of the countries with values between 20% and 29%, while 10 countries have the lowest level (less than 15%), among these the Unites States (13%).

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<sup>16</sup> We have done the accounting exercise for all countries listed in the LIS database; see for details *Documentation Guide LLBIFR Dataset on Relative Income Poverty 2019*.

**Figure 10 Social transfers as a proportion of households' gross income around 2013**



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

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%.

*6.2 Poverty reduction per social program*

To illustrate the idea of decomposing disposable income poverty, Table 7 presents the results of our sequential accounting decomposition exercise for the mean of 27 countries. These 27 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 27 countries 16.9 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 (9%). Income taxes lower disposable incomes and thus increase poverty. Other social benefit programs appear to have rather limited antipoverty effects.

**Table 7 Decomposition of disposable income poverty for 27 LIS countries 2013**

	Poverty rate (Pl60)	
(a) Poverty market income	35.7	
(b) Poverty disposable income	18.8	
Overall poverty reduction (a-b) = lifted out of poverty	16.9	
		<i>share</i>
<i>Transfers</i>	19.8	117%
Old-age/Disability/Survivor transfers	13.6	81%
Sickness transfers	0.3	2%
Family/Children transfers	2.4	14%
Education transfers	0.3	2%
Unemployment transfers	1.4	9%
Housing transfers	0.6	3%
General/food/medical assistance transfers	0.7	4%
Other transfers	0.5	3%
<i>Income taxes and social security contributions</i>	-2.9	-17%
Residual	0.0	0%

*Notes:*

- 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.
- LIS 27: Australia, Austria, Brazil, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Guatemala, Iceland, Ireland, Israel, Lithuania, Luxembourg, the Netherlands, Norway, Panama, Peru, Poland, Slovakia, South Africa, Spain, Switzerland, the United Kingdom and the United States.

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

In Table 8 we present the results of the decomposition of the trajectory of the poverty rate from market to disposable income for groups of countries for the 27 countries for the latest data year available in LIS. We clustered all countries to be a representative for English speaking countries, Continental European countries, Nordic countries, according to Esping-Anderson types of welfare states (Esping-Andersen and Myles, 2009; Arts and Gelissen, 2002; Bonoli, 1997; Ferrera, 1996).<sup>17</sup>

In Table 8, 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).

<sup>17</sup> The clustering of countries differs from section 5.3 because of another country selection in this section.

**Table 8 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 (a-b)	Partial effects									
				Old-age/ Disability/ Survivor	Sickness	Family/ Children	Education	Unemployment	Housing	General/food/ medical assistance	Other transfers	Income taxes	Residual
<b>panel a: LIS English speaking countries</b>													
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
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
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
<b>panel b: LIS Continental European countries</b>													
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
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
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
Switzerland 2013	23.9	14.8	9.1	15.0	0.0	1.0		0.8	0.1		1.8	-9.5	0.0
<b>panel c: LIS Nordic countries</b>													
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
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
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
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
<b>panel d: LIS Southern European countries</b>													
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
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

**Table 8 Decomposition of poverty ..... (continued)**

LIS Dataset	Poverty market income (a)	Poverty disposable income (b)	Poverty reduction (a-b)	Partial effects									
				Old-age/ Disability/ Survivor	Sickness	Family/ Children	Education	Unemployment	Housing	General/food/ medical assistance	Other transfers	Income taxes	Residual
<b>panel e: LIS Central Eastern European countries</b>													
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
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
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
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
<b>panel f: LIS BRICS</b>													
Brazil 2013	40.5	24.9	15.6	13.9				0.7		1.6	0.5	-1.1	0.0
South Africa 2012	42.1	29.8	12.3	8.1		6.4					0.2	-2.5	0.0
<b>panel g: Latin America</b>													
Guatemala 2014	21.5	22.3	-0.8	0.6			0.0			0.6	0.6	-2.7	0.0
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
<b>panel g: LIS others</b>													
Israel 2016	33.4	25.0	8.4	8.2		0.8		0.3		0.2	1.1	-2.2	0.0
Mean LIS-27	35.7	18.8	16.9	13.6	0.3	2.4	0.3	1.4	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: Database Caminada & 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. We even observe a negative impact on poverty alleviation of the total T/B-system in Guatemala.

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.

It should be noted that the results are hardly affected by the ordering effect. Following equation (7) in section 3.3, the partial antipoverty effect of a specific social transfer will be highest (smallest) when computed as the first (last) social program; see section 3.3. Our analysis shows that the residual term is rather modest and in most cases below 0.5 percent point (with an exception for Netherlands). Changing the order of adding a specific benefit to market income (or subtracting tax from gross income) does change the partial effect of this transfer (or tax) in total poverty reduction.

### *6.3 Poverty reduction per social program for different age-groups*

Similarly, Table 9 presents the results of our sequential accounting decomposition exercise for the mean of a selection of 27 LIS countries with full tax/benefit information, now for different age-groups. We present the results of the decomposition of the trajectory of the poverty rate from market to disposable income for all 27 countries (simple mean). Among all 27 countries 16.9 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 9.6, 8.6 and 56.3 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 (69%), 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 (58%), while pensions and unemployment benefits account for 29 percent and 19 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 -27 percent for the working-age population and only -5 percent for the elderly. Apparently, tax systems in the 27 countries included in this analysis are not very friendly for low income households with children.

**Table 9 Decomposition of disposable income poverty for different age-groups for 27 LIS countries 2013**

	Poverty total population		Poverty WA-population (18-64 year)		Poverty children (0-18 year)		Poverty elderly (65 and over)	
(a) Poverty market income	35,7		26,2		30,9		77,1	
(b) Poverty disposable income	18,8		16,6		22,3		20,8	
Overall poverty reduction (a-b) = population lifted out of poverty	16,9		9,6		8,6		56,3	
		<i>share</i>		<i>share</i>		<i>share</i>		<i>share</i>
<i>Transfers</i>	19,8	117%	12,1	127%	12,0	139%	59,2	105%
Old-age/Disability/Survivor transfers	13,6	81%	6,6	69%	2,5	29%	57,0	101%
Sickness transfers	0,3	2%	0,3	3%	0,3	4%	0,1	0%
Family/Children transfers	2,4	14%	1,7	18%	5,0	58%	0,4	1%
Education transfers	0,3	2%	0,4	4%	0,3	4%	0,0	0%
Unemployment transfers	1,4	9%	1,6	16%	1,6	19%	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%	0,6	7%	0,9	10%	0,3	0%
Other transfers	0,5	3%	0,4	5%	0,6	7%	0,5	1%
<i>Income taxes and social security contributions</i>	-2,9	-17%	-2,6	-27%	-3,3	-38%	-2,9	-5%
Residual	0,0	0%	0,0	0%	-0,1	-1%	0,1	0%

LIS 27: Australia, Austria, Brazil, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Guatemala, Iceland, Ireland, Israel, Lithuania, Luxembourg, the Netherlands, Norway, Panama, Peru, Poland, Slovakia, South Africa, Spain, Switzerland, the United Kingdom and the United States.

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

#### 6.4 The impact of welfare state effort on poverty reduction around 2013

In this section we perform a cross-national analysis of the relationship between social spending and poverty rate reduction through social transfers and income taxes at one moment in time. The objective is to analyze the variance in the antipoverty nature of social protection systems, or to put it differently, the effectiveness of welfare states in reducing poverty. The material presented is only descriptive and does not explain poverty alleviation or poverty structure. Such an analysis should ideally be based on a theory, which would have to address at least the following cross-national differences (cf. Gottschalk and Smeeding, 2000: 263): differences in labor markets that affect earnings of individual household members; demographic differences, such as the ageing of the population and growth of single parent households, which affect both family needs and labor market decisions; and differences across countries in tax and transfers policies that not only affect family income directly, but also may affect work and investment decisions. Two seminal books edited by Kakwani and Silber (2007 and 2008) present the panorama of the many dimensions of poverty from various disciplines. A fully-fledged model should be developed to assess the relative contributions of social factors and the economic development. Such a comprehensive approach is far beyond the scope of this paper. Here we simply show the bi-variate relationship between poverty reduction through the transfer and tax system and levels of social spending. We introduce an indicator of Public Policy Effectiveness on Poverty.

Table 10 presents the linkage between poverty reduction and the budget size of social transfers for 27 countries with full tax-benefit information in LIS. This gives a picture of the targeting of

social protection efforts across countries at one moment in time (latest data year available). Absolute antipoverty effects are divided by social benefits ratios to see which country targets best per one point of gross income spent on social transfers. Our analysis highlights some cross-country differences of poverty alleviation, although the ranking must be interpreted with caution due to cyclical factors. When we rank countries according to their ‘effectiveness’ of combating poverty (column e), each percentage point of gross income spent on social transfers alleviates poverty in South Africa, the United Kingdom, Ireland, Czech Republic and Poland by 1 percentage point and over, while the lowest scores are found in Switzerland, Panama, Peru and Guatemala (below 0.55). Average scores for ‘effectiveness’ are found in Slovakia, Luxembourg, Austria, Iceland, Lithuania, Finland, the Netherlands, Australia and Denmark.

Table 10 Targeting effect of social spending on poverty reduction in 27 LIS countries around 2013

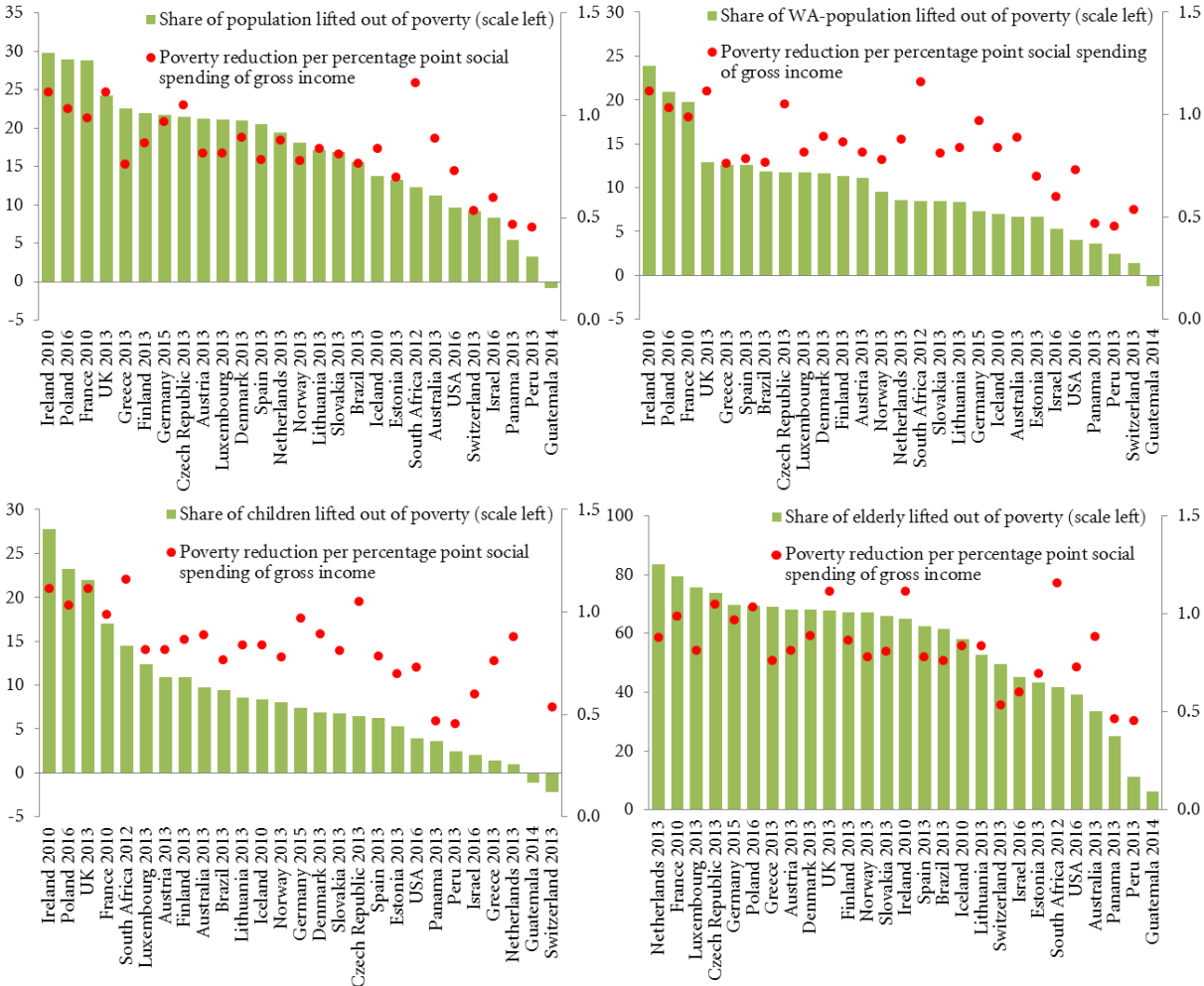
LIS Dataset	Poverty market income (a)	Poverty disposable income (b)	Poverty reduction (c) = (a)–(b)	Social transfers as % of households' gross income (d)	Public Policy Indicator (e) = (c/d)
South Africa 2012	42	30	12	11%	1.16
UK 2013	40	16	24	22%	1.11
Ireland 2010	46	17	30	27%	1.11
Czech Republic 2013	33	11	22	21%	1.05
Poland 2016	43	14	29	28%	1.03
France 2010	44	15	29	29%	0.99
Germany 2015	38	17	22	22%	0.97
Denmark 2013	33	12	21	24%	0.89
Australia 2013	33	21	11	13%	0.89
Netherlands 2013	32	12	19	22%	0.88
Finland 2013	36	14	22	25%	0.86
Lithuania 2013	37	20	17	21%	0.84
Iceland 2010	25	11	14	16%	0.84
Austria 2013	35	14	21	26%	0.81
Luxembourg 2013	38	16	21	26%	0.81
Slovakia 2013	31	14	17	21%	0.81
Spain 2013	43	23	21	26%	0.78
Norway 2013	32	14	18	23%	0.78
Brazil 2013	40	25	16	20%	0.76
Greece 2013	43	20	23	30%	0.76
USA 2016	34	24	10	13%	0.73
Estonia 2013	36	23	13	19%	0.70
Israel 2016	33	25	8	14%	0.60
Switzerland 2013	24	15	9	17%	0.53
Panama 2013	35	29	5	12%	0.46
Peru 2013	33	30	3	7%	0.45
Guatemala 2014	22	22	-1	3%	-0.30
Mean LIS-27	36	19	17	20%	0.85

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



Figure 11 illustrates best-practices across countries for poverty alleviation per age-group. Also the poverty reduction per percent social spending (= targeting) is shown.

**Figure 11 Public policy practices: people lifted out of income poverty (PL60) via T/B-systems in 27 countries (latest data year available)**



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

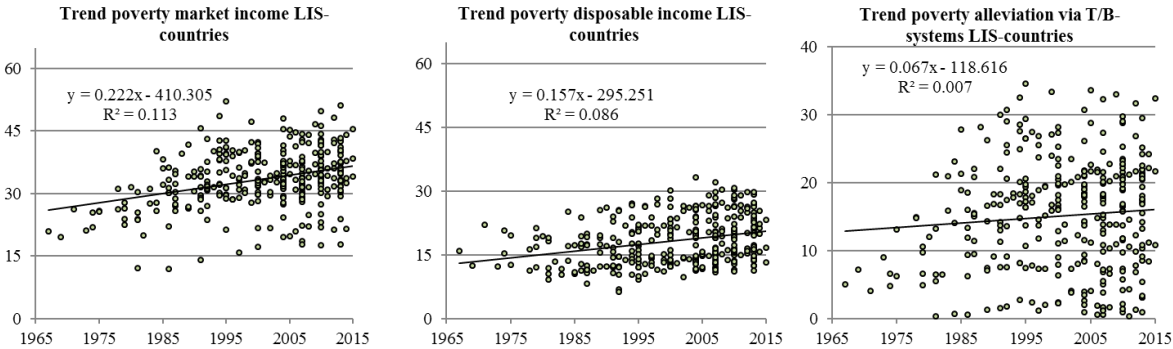
**7. Trends in market and disposable income poverty in LIS countries 1967-2016**

*7.1 Introduction and overview*

What is the trend of poverty reduction over time? Figure 12 gives a sneak preview of the trend in the poverty rates of market income and disposable income, and poverty reduction across time and space for all 339 datasets in LIS 1967-2016. A wide variety exists across time and space in both the level of poverty of market and disposable income and poverty reduction. The general pattern is that income poverty rose over time across 49 LIS countries, which is confirmed by a simple regression analysis in Figure 12. The estimated trend coefficients of both the poverty rate of market income and the poverty rate of disposable income are statistically significant ( $p < 0.01$ ) and positive. However, among the 49 LIS countries we do not

find a general pattern that tax-benefit systems became more or less redistributive over time ( $\neq$ lift more or less people out of poverty). The redistributive effects of T/B-systems on household income poverty vary widely across countries and time.

**Figure 12 Poverty market income, poverty disposable income and poverty reduction across time and space**



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

7.2 Income poverty across countries 1985-2014

This section shows cross national comparisons of market and disposable income poverty over time. In empirical studies, the selection of countries and data-years differs due to the consideration of data quality and data availability. We selected 15 countries with at least three data points (around 1985, 1997 and 2010 or later). Moreover, we selected countries for which full information is available on the whole trajectory from market income to disposable income: Australia (85-95-13), Canada (87-97-13), Denmark, (87-95-13), Finland (87-95-13), France (84-94-10), Germany (84-94-13), Ireland (87-96-10), Israel (86-97-16), the Netherlands (83-99-13), Norway (86-95-13), Sweden (87-95-05), Switzerland (82-00-13), Taiwan (86-97-13), the United Kingdom (86-99-13) and the United States (86-97-13). The changes in poverty rates of the total population are illustrated. In order to give a general idea, we cluster countries around 1985, 1997, and 2014 respectively, showing the average trends of poverty and poverty alleviation. We show country profiles for all LIS countries in Annex A.

Table 11 shows the 15 country-average trend of market income poverty and disposable income poverty among the total population from 1985 to 2014. This table highlights some significant differences across periods in a general way. On average, poverty increased markedly. This increase was stronger during the period 1997-2014, compared to the period 1985-1997. Increasing poverty was driven by rising market poverty which was partly offset by social security transfers and income taxes and social security contributions. Also in the second decade, market income poverty grew at a faster rate compared to disposable income poverty. Market income poverty has increased substantially by 5.8 percent of the total population over a thirty-year period averaged over the countries included in the analysis. Market income poverty has been the main driver of the trend in disposable income poverty, but antipoverty policies did have a substantial effect as well. Between 1983 and 2014, T/B-systems compensated 82 percent of the increase in market income poverty. Market income poverty rose by about 5.8 percent of total population, while poverty alleviation via T/B-systems rose by 4.8 percent. T/B-systems reduced poverty by about 51 percent around 2013; more than in the mid-1980s (45%); see Table 11.

**Table 11 Trend poverty market income and poverty disposable income and poverty reduction, 1983-2014**

	Poverty market income (PL60)				Poverty disposable income (PL60)				Poverty alleviation via T/B-systems			
	around 1985	around 1997	around 2013	change 85-13	around 1985	around 1997	around 2013	change 85-13	around 1985	around 1997	around 2013	change 85-13
Australia (85-95-13)	26.7	31.3	32.5	5.8	19.6	20.6	21.3	1.7	7.1	10.7	11.2	4.1
Canada (87-97-13)	27.0	32.1	35.1	8.1	17.5	18.4	21.0	3.5	9.6	13.7	14.2	4.6
Denmark (87-95-13)	28.8	31.4	33.4	4.6	17.3	12.0	12.4	-4.9	11.4	19.4	21.0	9.5
Finland (87-95-13)	25.9	35.7	36.0	10.1	10.7	9.1	14.0	3.3	15.2	26.6	22.0	6.8
France (84-94-10)	40.2	42.7	44.3	4.1	17.0	14.1	15.5	-1.5	23.2	28.6	28.8	5.6
Germany (84-98-15)	27.8	30.9	38.4	10.6	13.7	11.4	16.7	3.0	14.1	19.5	21.7	7.6
Ireland (87-96-10)	35.5	38.9	46.4	10.8	20.0	<i>21.9</i>	16.6	-3.4	15.5	<i>17.1</i>	29.8	14.3
Israel (86-97-16)	31.3	33.7	33.4	2.0	19.4	21.9	25.0	5.6	11.9	11.8	8.4	-3.5
Netherlands (83-99-13)	31.3	27.8	31.8	0.5	10.3	11.1	12.4	2.1	21.0	16.7	19.5	-1.6
Norway (86-95-13)	22.2	29.6	31.7	9.5	12.8	13.3	13.6	0.8	9.4	16.3	18.1	8.7
Sweden (87-95-05)	32.3	39.5	34.7	2.3	11.5	10.0	12.0	0.4	20.8	29.5	22.7	1.9
Switzerland (82-00-13)	20.0	21.8	23.9	3.9	13.5	13.8	14.8	1.3	6.5	7.9	9.1	2.7
Taiwan (86-97-16)	11.9	15.9	18.6	6.7	11.3	14.8	16.0	4.7	0.6	1.1	2.7	2.1
United Kingdom (86-99-13)	36.3	37.7	40.5	4.2	17.7	21.8	16.3	-1.4	18.6	15.9	24.2	5.6
United States (86-97-16)	30.1	31.0	33.9	3.8	23.9	23.7	24.3	0.4	6.2	7.3	9.7	3.4
Mean-15	28.5	32.0	34.3	5.8	15.7	15.9	16.8	1.0	12.7	16.1	17.5	4.8

*Notes*

Ireland 1996: income data net of income taxes (marked *italic*).

Sweden is included although latest data year available is 2005.

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

Country-specific results are also presented in Table 11. Tax-benefit systems in Ireland, Germany, Norway, Finland, Denmark and the United Kingdom achieve the greatest reduction in poverty, lowering poverty rates by 20 points or more around 2014, while the smallest antipoverty effects are seen in Taiwan, Israel, Switzerland and the United States (less than 10 points).

Through the entire period, disposable income poverty became significantly larger in Israel and Taiwan, whereas it decreased in France, Ireland, the United Kingdom and Denmark. In the period 1985-1997 disposable income poverty on average hardly changed. Denmark and France realized a relatively large decrease in disposable income poverty, while Taiwan and the United Kingdom showed a marked increase in poverty levels. Cross-country variance is larger since the mid-1990s. Market income poverty increased in most countries (with Israel and Sweden as exceptions), markedly in Ireland, Germany, the Netherlands and Switzerland. Disposable income poverty also increased in most countries except for Ireland and the United Kingdom. On average only 60 percent of the rise of income poverty was offset by poverty alleviation through taxes and transfers in the period 1997-2014 (was: 97% for 1985-1997). Poverty reduction rose in 13 of our 15 countries in the period 1985-2013 with the Netherlands and Israel as exceptions.

In contrast to the results in Immervoll and Richardson (2011), we do not confirm their finding that tax-benefit policies have become less effective in redistribution since the mid-1990s, independent of whether the total population or the working-age population is taken into consideration; see Table 12. Over the period 1985-2014 the antipoverty effect of taxes and benefits on household income poverty increased, both for the working-age and for the total population. For the working-age population poverty reduction only slightly decreased since the mid-1990's. But in general, the tax-benefit systems in the mid-2000s are more effective at reducing income poverty compared to the mid-1980s, both for the total population and the working-age population. So, the claim that reduced redistribution is a main driver of increasing poverty should be weakened. Moreover, our finding is a stimulus to analyze several programs (parts) of poverty alleviation via T/B-systems in more detail, especially from 1995 onwards.

**Table 12 Trend in poverty reduction among working-age and total population, 1985-2014**

	Total population			Working-age population		
	Poverty market income	Poverty disposable income	Poverty reduction	Poverty market income	Poverty disposable income	Poverty reduction
Around 1985	28.5	15.7	12.7	20.7	12.7	8.0
Around 1997	32.0	15.9	16.1	23.2	13.1	10.1
Around 2014	34.3	16.8	17.5	24.3	14.8	9.6
Change 1985-2014	5.8	1.0	+4.8	3.6	2.0	+1.6
Change 1985-1997	3.5	0.1	+3.4	2.5	0.4	+2.1
Change 1997-2014	2.3	0.9	+1.4	1.1	1.6	-0.5
	<i>Share of rise poverty market income offset by fiscal redistribution</i>			<i>Share of rise poverty market income offset by fiscal redistribution</i>		
1985-2014		82%			44%	
1985-1997		97%			84%	
1997-2014		60%			-44%	

LIS 15: Australia, Canada, Denmark, Finland, France, Germany, Ireland, Israel, the Netherlands, Norway, Sweden, Switzerland, Taiwan, the United Kingdom and the United States.

Source: Database Wang & Caminada (2017) based on LIS, and own calculations

### 7.3 Antipoverty effect of T/B-systems 1985-2014

Table 13 illustrates the trends of poverty reduction via transfers and via income taxes for each 15 LIS countries. In all countries, changes in the share of population lifted out of poverty is mainly driven by social transfer redistribution.

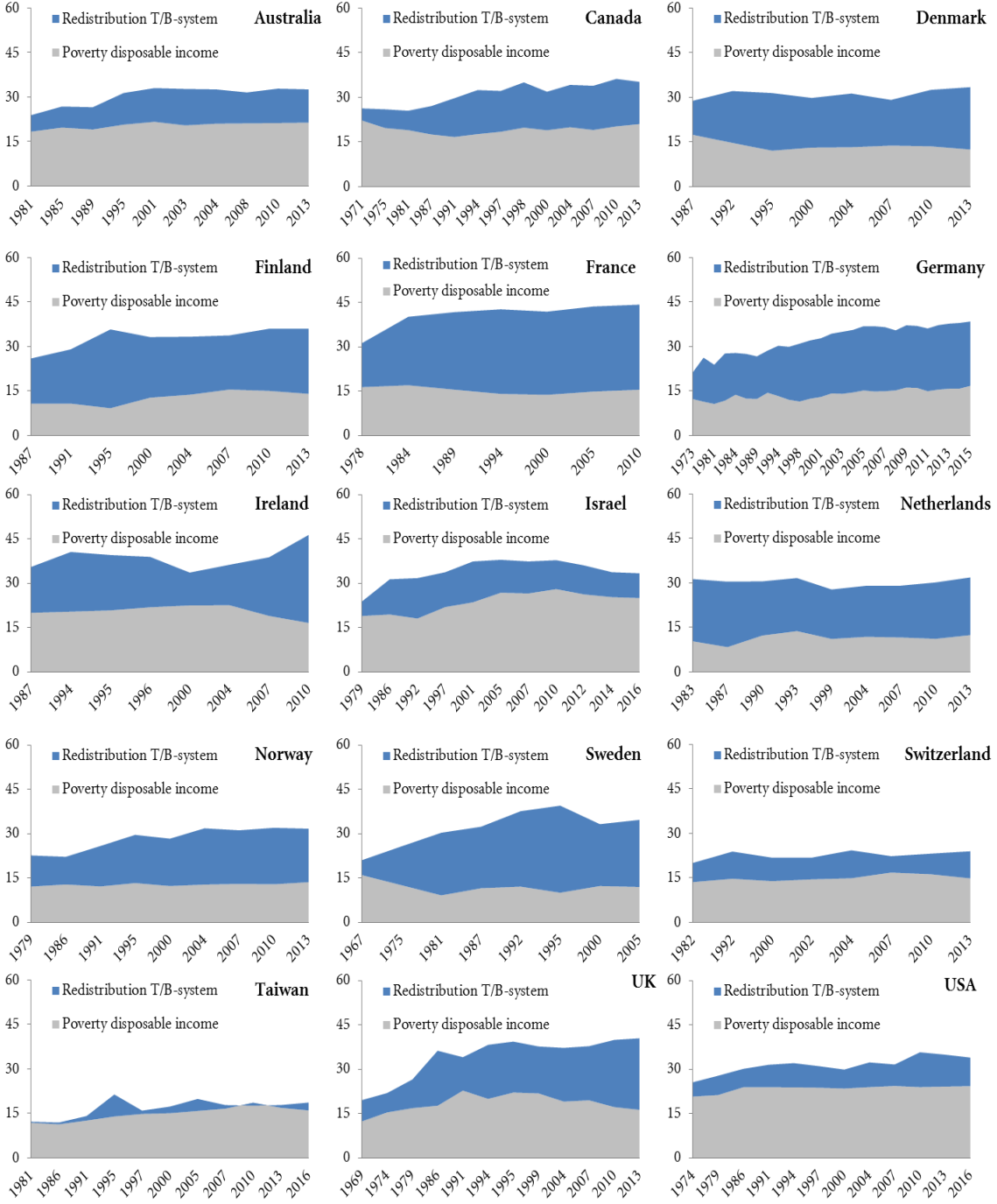
**Table 13 Poverty reduction via T/B-systems across 15 LIS countries, 1985-2014**

	Poverty reduction = population lifted out of poverty				Partial effects: changes 1985-2014	
	around 1985	around 1997	around 2014	change 85-14	From Transfers	From Taxes
Australia (85-95-13)	7.1	10.7	11.2	4.1	4.1	0.0
Canada (87-97-10)	9.6	13.7	14.2	4.6	5.2	-0.5
Denmark (87-95-13)	11.4	19.4	21.0	9.5	10.6	-1.1
Finland (87-95-13)	15.2	26.6	22.0	6.8	7.8	-1.0
France (84-94-10)	23.2	28.6	28.8	5.6	4.8	0.8
Germany (84-94-13)	14.1	19.5	21.7	7.6	8.3	-0.7
Ireland (87-96-10)	15.5	17.1	29.8	14.3	13.0	1.2
Israel (86-97-16)	11.9	11.8	8.4	-3.5	-4.1	0.6
Netherlands (83-99-13)	21.0	16.7	19.5	-1.6	0.4	-1.9
Norway (86-95-13)	9.4	16.3	18.1	8.7	10.6	-1.8
Sweden (87-95-05)	20.8	29.5	22.7	1.9	2.4	-0.5
Switzerland (82-00-13)	6.5	7.9	9.1	2.7	9.2	-6.5
Taiwan (86-97-13)	0.6	1.1	2.7	2.1	6.9	-4.9
UK (86-99-13)	18.6	15.9	24.2	5.6	4.9	0.8
USA (86-97-13)	6.2	7.3	9.7	3.4	3.4	0.0
Mean-15	12.7	16.1	17.5	4.8	5.8	-1.0

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

From the mid-1980s to around 2013, poverty alleviation increased in all countries except Israel and the Netherlands. This was driven by additional redistribution of social transfers. Taxes increased poverty to a large extent in Switzerland and Taiwan. Figure 13 shows the country profiles.

**Figure 13 Trends in poverty and poverty reduction via T/B-systems in 15 LIS countries**



Source: Database Caminada & Wang (2019)

#### *7.4 Poverty and poverty reduction before and after the Great Recession*

This section examines the impact of the economic crisis that started in 2008 on income distribution and poverty reduction. 23 countries are selected which contain full information on income and taxes before the Great Recession (around 2006-2007) and the latest year (2012 and later). As shown in Table 14, market income poverty has increased in most countries since around 2007, except for Brazil, Guatemala, Israel, Panama and Peru. However, disposable income poverty has decreased in a large number of countries with a 0.4 percent point decrease on average. The most significant reduction in disposable income poverty can be seen in Guatemala with 23 percent. Estonia, Germany and Spain, on the other hand, are the countries with the largest increase in inequality of disposable income. We do not find that antipoverty effects via T/B-systems have been less effective since the Great Recession. On the contrary, the increase in poverty alleviation has been more than offsetting the rising market income poverty and led to lower disposable income poverty on average. Greece, Spain, Denmark and the United Kingdom are the countries with the largest increase in poverty reduction (over 5 percent points).

**Table 14 Trend poverty of market income and poverty of disposable income and poverty reduction, 2007-2013**

	Poverty market income			Poverty disposable income			Poverty reduction = lifted out of poverty		
	Before crisis	After crisis	Change 2007-2013	Before crisis	After crisis	Change 2007-2013	Before crisis	After crisis	Change 2007-2013
Austria 2007-2013	34.0	35.4	1.4	15.9	14.2	-1.7	18.1	21.2	3.1
Brazil 2006-2013	41.3	40.5	-0.8	26.5	24.9	-1.6	14.8	15.6	0.8
Czech Republic 2007-2013	31.6	32.9	1.3	10.8	11.3	0.5	20.7	21.5	0.8
Denmark 2007-2013	29.1	33.4	4.3	13.7	12.4	-1.3	15.3	21.0	5.6
Estonia 2007-2013	30.5	36.3	5.8	20.6	23.0	2.4	9.9	13.3	3.4
Finland 2007-2013	33.7	36.0	2.3	15.4	14.0	-1.4	18.3	22.0	3.7
Germany 2007-2013	36.5	38.4	1.9	14.9	16.7	1.8	21.6	21.7	0.1
Greece 2007-2013	32.2	42.7	10.4	19.2	20.1	0.9	13.0	22.5	9.5
Guatemala 2006-2014	31.0	21.5	-9.5	29.1	22.3	-6.8	1.9	-0.8	-2.7
Israel 2007-2016	37.4	33.4	-4.0	26.6	25.0	-1.6	10.8	8.4	-2.4
Luxembourg 2007-2013	32.3	37.6	5.3	14.4	16.4	2.0	17.9	21.1	3.3
Netherlands 2007-2013	29.0	31.8	2.8	11.6	12.4	0.8	17.5	19.5	2.0
Norway 2007-2013	31.1	31.7	0.5	13.0	13.6	0.6	18.1	18.1	0.0
Panama 2007-2013	34.9	34.6	-0.3	29.8	29.2	-0.6	5.0	5.4	0.4
Peru 2007-2013	35.9	33.2	-2.8	32.1	29.9	-2.2	3.8	3.3	-0.5
Poland 2007-2013	42.9	42.5	-0.4	15.5	17.3	1.8	27.4	25.2	-2.2
Slovakia 2007-2013	29.8	30.7	0.9	12.8	13.8	1.1	17.0	16.9	-0.2
South Korea 2006-2012	21.0	21.3	0.3	20.4	20.1	-0.3	0.6	1.3	0.6
Spain 2007-2013	32.9	43.3	10.4	20.4	22.7	2.3	12.5	20.6	8.1
Switzerland 2007-2013	22.3	23.9	1.6	16.7	14.8	-2.0	5.5	9.1	3.6
Taiwan 2007-2013	17.8	17.8	0.0	16.5	16.8	0.3	1.2	0.9	-0.3
United Kingdom 2007-2013	37.8	40.5	2.7	19.5	16.3	-3.2	18.3	24.2	5.9
United States 2007-2013	31.6	34.9	3.3	24.3	24.1	-0.2	7.3	10.8	3.5
Mean LIS-23	32.0	33.7	1.6	19.1	18.8	-0.4	12.9	14.9	2.0

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



On average income poverty decreased slightly and poverty alleviation rose since the Great Recession among the total population (mean 23 LIS-countries). Deviation from this general trend for age-groups is noticeable. The increase in antipoverty effects of T/B-systems mainly comes from social transfers targeted towards the elderly, and to a much lesser extent to children; see Table 15 (panel c and d). However, poverty among the working-age population increased slightly. Although all changes are rather small, our findings are not fully in line with OECD (2015: 102) which states that the economic recovery has not reduced income inequality and poverty, because poverty alleviation decreased in a majority of countries recently. However, both OECD (2015) and our analysis find that poverty alleviation dampened the increase in market income inequality (and poverty) since 2007. The differences between market income poverty and disposable income poverty varied considerably across countries and time, thus revealing significant differences in the ability of T/B-systems to cushion the rise of income inequality and poverty (cf. OECD, 2015: 103).

**Table 15 Trend in antipoverty effects among total population and age-groups, 2007-2013**

	<i>(a) Total population</i>			<i>(b) Working-age population</i>		
	Poverty market income	Poverty disposable income	Poverty reduction	Poverty market income	Poverty disposable income	Poverty reduction
Around 2007	32.0	19.1	12.9	23.2	15.7	7.5
Around 2013	33.7	18.8	14.9	24.4	16.4	8.0
Change	1.6	-0.4	2.0	1.2	0.7	0.5
- from social transfers			1.8			0.5
- from taxes			0.2			0.0

	<i>(c) Children (0-18)</i>			<i>(d) Elderly (65 and over)</i>		
	Poverty market income	Poverty disposable income	Poverty reduction	Poverty market income	Poverty disposable income	Poverty reduction
Around 2007	27.0	22.2	4.8	75.5	26.8	48.7
Around 2013	27.9	22.1	5.8	74.9	22.1	52.8
Change	0.9	-0.2	1.1	-0.6	-4.7	4.1
- from social transfers			0.9			3.1
- from taxes			0.2			0.9

LIS 23: Australia, Brazil, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Guatemala, Israel, Luxembourg, the Netherlands, Norway, Panama, Peru, Poland, Slovakia, South Korea, Spain, Switzerland, Taiwan, the United Kingdom and the United States.

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

### 7.5 Program size and targeting of transfers

Considering the redistributive effect of social benefits, a distinction can be made between programs' size and the extent to which benefits are targeted toward low-income groups by means-testing; see section 4.3. Using LIS micro data it is possible to calculate a measure of the average value of social transfers as a percentage of households' gross income: the larger the value, the greater the share of total income that is derived from transfers. It is also possible to calculate a summary index of the degree to which transfers are targeted toward low-income groups. This is

done by applying Kakwani's (1986) 'index of concentration' to transfers (see section 4.3). This index takes on the value of -1.0 if the poorest person gets all transfer income, 0 if everybody gets an equal amount, and +1.0 if the richest person gets all transfer income.

Based on a rather lengthy time-series around 1985-2013 figures for the size and target efficiency of social benefits are calculated for 15 LIS countries and are reported in Table 16.

**Table 16 Budget size and targeting efficiency across 15 LIS countries, 1985-2014**

	Budget size (%)			Targeting		
	around 1985	around 2014	change 85-14	around 1985	around 2014	change 85-14
Australia (85-13)	10.7%	12.7%	1.9%	-0.340	-0.279	0.061
Canada (87-13)	12.8%	18.2%	5.4%	-0.184	-0.045	0.139
Denmark (87-13)	20.5%	23.6%	3.0%	-0.122	-0.199	-0.077
Finland (87-13)	19.1%	25.5%	6.4%	-0.150	-0.033	0.117
France (84-10)	23.0%	29.1%	6.1%	0.026	0.082	0.056
Germany (84-13)	17.1%	22.4%	5.3%	-0.257	-0.113	0.144
Ireland (87-10)	18.9%	26.8%	7.9%	-0.149	-0.087	0.062
Israel (86-16)	14.6%	14.0%	-0.6%	-0.109	0.010	-0.033
Netherlands (83-13)	29.0%	22.2%	-6.8%	-0.003	-0.117	-0.114
Norway (86-13)	14.0%	23.2%	9.2%	-0.244	-0.064	0.180
Sweden (87-05)	27.6%	28.1%	0.4%	-0.030	-0.074	-0.044
Switzerland (82-13)	8.1%	17.2%	9.1%	0.089	-0.144	-0.232
Taiwan (86-13)	0.5%	10.6%	10.1%	0.048	0.066	0.018
UK (86-13)	21.9%	21.7%	-0.1%	-0.138	-0.123	0.016
USA (86-13)	10.9%	13.2%	2.3%	-0.207	-0.098	0.108
Mean-15	16.6%	20.6%	4.0%	-0.118	-0.081	0.037

LIS 15: Australia, Canada, Denmark, Finland, France, Germany, Ireland, Israel, the Netherlands, Norway, Sweden, Switzerland, Taiwan, the United Kingdom and the United States.

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

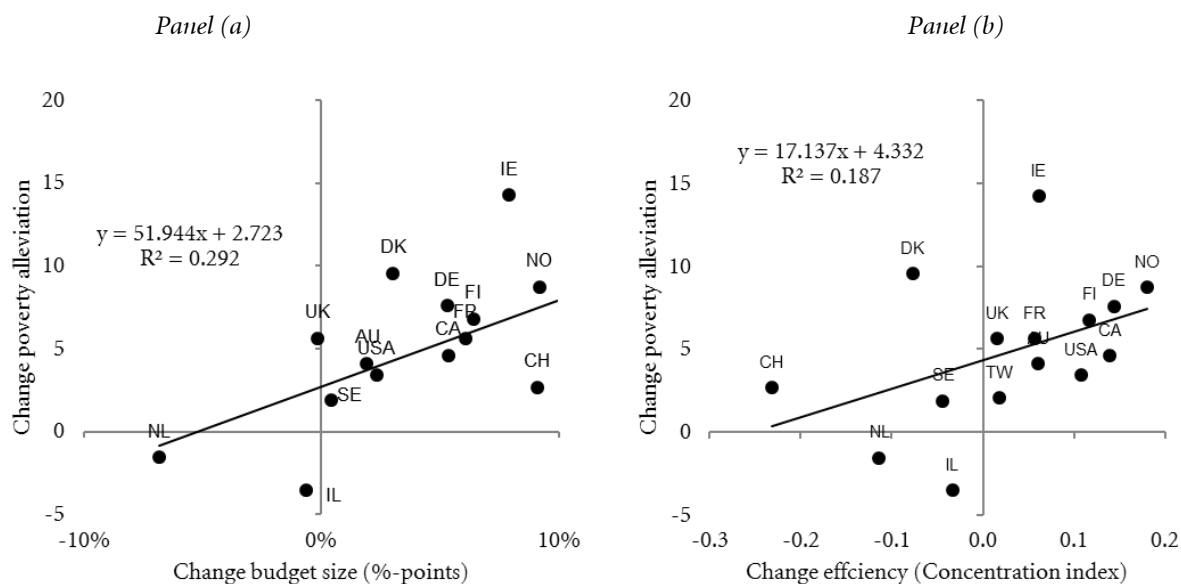
There is considerable variance among countries in the average size of social benefits relative to total household income. In the mid-1980s, five countries (Denmark, France, the Netherlands, Sweden and the United Kingdom) achieve a high budget size of transfers (20% or more), whereas it is low in Australia, Canada, Israel, Norway, Switzerland, Taiwan and the United States (less than 15%). Around 2014, more countries achieve a high budget size (20% or over), while Australia, Canada, Israel, Switzerland, Taiwan and the United States still have budget sizes less than 15 percent. Over time social benefits size increased in all countries, with an exception for the Netherlands.

Targeting efficiency is more diverse across countries. In the mid-1980s, cash benefits are most targeted to the poor in Australia and Germany (values less than -0.25), and more universally distributed in Sweden, the Netherlands and France (values between -0.03 and +0.03). Around 2014, Australia targeted more to the poor than other countries (-0.28). Transfers were spread more universally in 10 out of our 15 countries. On the contrary, we observe social benefits to be more targeted to the poor over time in Switzerland, the Netherlands, Israel, Denmark and Sweden.

Changes in the poverty alleviation (= people lifted out of poverty via T/B-systems) appear to be statistically significant related to changes in the overall budget size ( $p < 0.05$ ; see figure 14, panel

a), while no relationship is found with changes in the targeting of T/B-systems (see Figure 14, panel b). Especially Ireland, Denmark and Norway experienced an increase in both the budget size and poverty alleviation, while poverty alleviation and the budget size of social programs declined in the Netherlands.

**Figure 14 Changes in poverty alleviation, budget size and targeting 15 countries, 1985-2014**



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

## 8. Decomposition antipoverty effects of social transfers and income taxes over time

How have the redistributive effects of the different parts of welfare states altered over time and across countries? This section shows trends of detailed antipoverty effects across a selection of LIS countries with full information on taxes and benefits. 8 countries are selected on the basis of two criteria: 1) the country has full tax/benefit information at least three data points (around 1985, around 1997 and 2010 or later); 2) the category *Other transfers* amounts to less than 20 percent of poverty reduction.

We calculate the following (partial) antipoverty effects over time, based on the LIS household income components list: 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. As explained before, we consider state old-age pension benefits as part of our analysis, because they are part of the safety net and generate significant reduction in poverty and income inequality. Occupational and private pensions are also taken into account.

Table 17 reports the trends of antipoverty effects of the different parts of tax-benefit system averaged for eight LIS countries from the mid-1980s to around 2014. The dominant pattern was that of increasing poverty alleviation. Increasing antipoverty effects came mainly from old-age/disability/survivor benefits and to a much lesser extent from unemployment benefits and housing benefits. Less poverty alleviation was generated by sickness benefits, education benefits and other transfers. Income taxes and social security contributions do have a negative impact on poverty alleviation. This negative effect increased over time.

**Table 17 Decomposition of disposable income poverty for 8 countries 1985-2016: averages by periods**

	Poverty around 1985	Poverty around 1995	Poverty around 2014	Change 1985-2014
(a) Poverty market income	29.1	31.9	34.3	5.1
(b) Poverty disposable income	16.1	15.7	18.0	1.9
Poverty reduction (a-b) = lifted out of poverty	13.1	16.1	16.3	3.2
<i>Transfers</i>	<i>15.6</i>	<i>19.5</i>	<i>20.1</i>	<i>4.5</i>
Old-age/Disability/Survivor transfers	9.9	13.0	14.4	4.5
Sickness transfers	0.2	0.3	0.1	-0.1
Family/Children transfers	1.9	2.3	2.0	0.1
Education transfers	0.6	0.4	0.3	-0.3
Unemployment transfers	1.0	1.7	1.4	0.4
Housing transfers	0.1	0.7	0.7	0.6
General/food/medical assistance transfers	0.2	0.4	0.5	0.3
Other transfers	1.6	0.6	0.6	-1.0
<i>Income taxes and social security contributions</i>	<i>-2.6</i>	<i>-3.4</i>	<i>-3.7</i>	<i>-1.1</i>
Residual	0.1	0.1	-0.1	-0.2

*Notes*

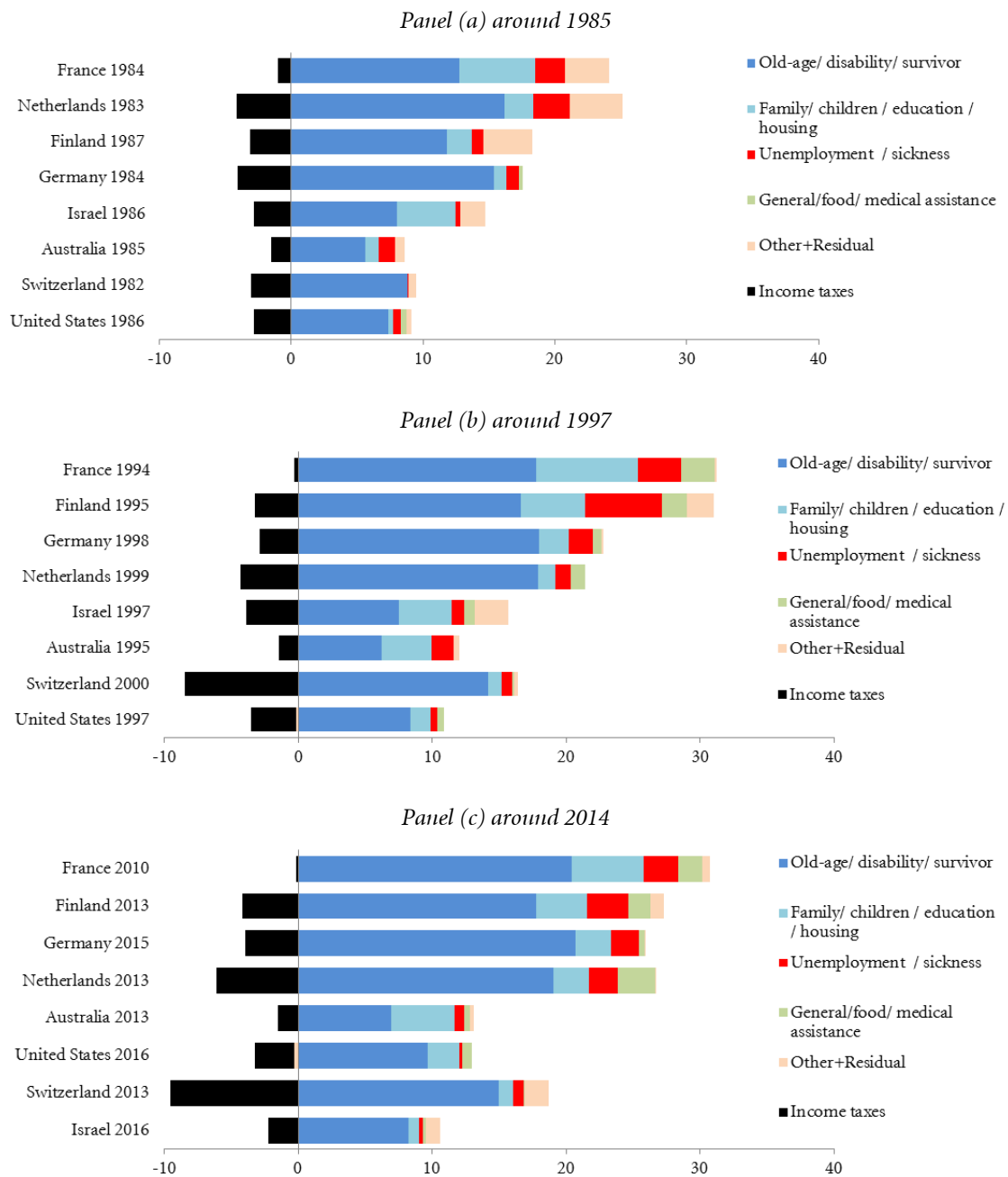
- When we take the mean of the decomposition results across countries, the sum of all partial antipoverty effects amount (a little) over 100 percent due to missing observations. We rescaled the antipoverty effects of each social program by applying an adjustment factor, which is defined as the overall 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.
- Selected countries: Australia, Finland, France, Germany, Israel, the Netherlands, Switzerland, and the United Kingdom.

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

With respect to trends in the antipoverty effects of several social programs across countries, the results are diverse. Figure 15 presents how the antipoverty effect of each social program changed over time across 8 LIS countries. Countries are ranked in order to their poverty reduction (= population lifted out of poverty via T/B-systems) from highest to lowest. France and Finland are located in the top-3 of countries with relatively high levels of poverty alleviation. On the bottom of our list we find the United States, Switzerland and Israel with the lowest levels of poverty alleviation by social transfers and income taxes.

Note that the country ranking altered over time. The Netherlands dropped in our country ranking on poverty alleviation from place 2 to 4, and Israel from place 5 to 8.

**Figure 15 Decomposition of poverty reduction via T/B-systems in 8 countries, 1985-2014**



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

Old-age/disability/survivor benefits attribute most to poverty alleviation in all countries. From the mid-1980s to around 2014, the main pattern was an increasing contribution of these programs to poverty reduction in all countries. Overall, old age/disability/survivors benefits lifted 9.9 percent of the population out of poverty among our 8-country-average around 1985 and 14.4 percent around 2014.

The antipoverty effect of benefits for family/children, education and housing varies across countries. Overall, these benefits account for 2 percent of the total poverty alleviation via T/B-systems among our 8-country-average in 2014; a slight increase with 0.1 point since 1985.

The antipoverty effect of unemployment compensation and sickness benefits decreased in half of the countries, namely Australia, Israel, the Netherlands and the United States. The overall contribution of unemployment and sickness benefits to total poverty reduction among our 8-country-average was 1.2 percent around 1985 and 1.5 percent around 2014.

Income taxes and social security contributions increasingly attributed to higher poverty over the period 1985-2014: 2.6 percent of the total population around 1985 versus 3.7 percent around 2014. However, cross-country differences are large. Income taxes reduced poverty alleviation over time especially in Switzerland and to a lesser extent in the Netherlands.

## **9. Conclusion and future research**

### *9.1 Income poverty and poverty alleviation via T/B-systems around 2013*

In the first part of this paper, we have investigated income poverty and the poverty reducing effect via social transfers and income taxes across 49 countries around 2013, using the micro household income data from LIS. We have provided market income poverty and disposable income poverty figures, total poverty alleviation via the T/B-system and disaggregated redistributions in a comparative way, across much more countries than that have been studied before, offering an accurate, detailed picture of redistribution of incomes through social transfers and across social welfare states.

Among 49 countries, the average poverty level is around 20 percent of the total population. The lowest poverty rates (PL60) 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. Generally speaking, European countries achieve lower levels of disposable income poverty than other countries. The pattern of market income poverty (before social transfers and taxes) is quite different: Serbia, Ireland and Hungary have the highest level of market income poverty, while Taiwan, South Korea, Guatemala and Switzerland have rather low levels of market income poverty. Also the poverty reducing effect of social transfers and income taxes differs considerably across countries. With the highest figures for Hungary, Ireland, Poland and France, while poverty reduction is rather small in Taiwan, Dominican Republic, South Korea and Guatemala.

On average, social transfers reduce market income poverty 17 points, while income taxes increase poverty with 2 points. In most countries social transfers are the dominant instrument in reducing poverty. We also find that this antipoverty effect of T/B-systems can almost fully be attributed to the budget size of transfers, while the extent to which benefits are targeted toward low income groups does not seem to play a significant role.

On average 15 percent of the total population is lifted out of poverty via T/B-systems around 2013. Poverty reduction for the working-age population and children is lower (on average) with figures of respectively 9 and 8 percent. In contrast, poverty reduction via T/B-systems among the elderly is much higher: 48 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 have to mention, however, that these figures are strongly influenced by our choice to earmark old age pensions as transfer income and not as market income.

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 (9%). Income taxes lower disposable income and

thus increase poverty. Other social benefit programs appear to have rather limited antipoverty effects.

We also analyzed the relationship between the budget size of social transfers and poverty rate reduction. Thus, an indication is given of the 'effectiveness' of combating poverty. Each percentage point of gross income spent on social transfers alleviates poverty by 1 percentage point and over in South Africa, the United Kingdom, Ireland, Czech Republic and Poland, while low scores (less than 0.5 percentage points) are found for Panama, Peru and Guatemala. In the group of developed economies, Switzerland and the US are not very effective in reducing poverty.

### *9.2 Trends in income poverty and poverty alleviation 1985-2014*

In the second part of this paper, we have investigated changes of poverty over time and whether and to what extent social transfers and income taxes have contributed to this trend. We have provided trends of market income poverty and disposable income poverty, overall and disaggregated antipoverty effects by social programs in a comparative way. We have applied a sequential budget incidence analysis for a selected group of 15 countries (with full tax/benefit information). On average market income poverty increased by 5.8 percent of the total population over a thirty-year period averaged over the countries shown. This is a substantial increase for a relatively short period of time. Market income poverty has been the main driver of the trend in disposable income poverty, although antipoverty policies did have a substantial effect as well. Between 1983 and 2014, T/B-systems compensated 82 percent of the increase in market income poverty. Social transfers and income taxes reduced poverty by about 51 percent around 2014; more than in the mid-1980s (45 percent). In contrast to the results of other studies, we do not find that T/B-systems have become less effective in reducing poverty. Tax/benefit-systems around 2014 are more effective at combatting poverty compared to the mid-1980s and the mid-1990s. Overall, the dominant pattern during 1985-2014 was that of increasing poverty alleviation. Increasing antipoverty effects came mainly from old-age/disability/survivor benefits and to a much lesser extent from unemployment benefits and housing benefits. Less poverty alleviation was generated by sickness benefits, education benefits and other transfers. Income taxes and social security contributions do have a negative impact on poverty alleviation. This negative effect increased over time.

Changes in the poverty alleviation (= people lifted out of poverty via T/B-systems) for the period 1983-2014 appear to be statistically significant related to changes in the overall budget size, while no relationship is found with changes in the targeting of T/B-systems.

### *9.3 Future research*

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

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## **Annex A Documentation Guide Leiden LIS Budget Incidence Fiscal Redistribution Dataset on Relative Income Poverty 2019 for 49 LIS countries - 1967-2016**

Assembled by Koen Caminada & Jinxian Wang

Version 1, February 2019

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### **Dataset available via websites:**

- ✓ LIS Cross-National Data Center in Luxembourg:  
<http://www.lisdatacenter.org/resources/other-databases/>
- ✓ Leiden University, Department of Economics:  
<https://www.universiteitleiden.nl/en/law/institute-for-tax-law-and-economics/economics/data-sets>

### **Download**

[Leiden LIS Budget Incidence Fiscal Redistribution Dataset on Relative Income Poverty Rates 2019](#)

A more detailed description of these data and method will come available in Koen Caminada, Jinxian Wang, Kees Goudswaard & Chen Wang (2019), Relative income poverty rates and poverty alleviation via T/B-systems in 49 LIS-countries (1967-2016), *LIS Working Paper*. Please cite this working paper when referring to the data set, along with the web address [www.economie.leidenuniv.nl](http://www.economie.leidenuniv.nl).

## Aim

The Leiden LIS Budget Incidence Fiscal Redistribution Dataset on Relative Income Poverty Rates 2019 presents the disentanglement of poverty and the antipoverty effect of social transfers and income taxes in 49 LIS countries for the period 1967-2016 (Waves I - Wave X of LIS). This dataset allows researchers and public policy analysts to compare fiscal redistribution across developed countries and middle income countries over the last five decades. Research may employ these data in addressing several important research issues. Often addressed questions in the empirical literature on the welfare state concerns the sources of variance across countries and over time in the extent and nature of fiscal redistribution. Changes (in the generosity) of welfare states can be linked to (changes in the) poverty alleviation. Best-practice among countries can be identified and analyzed in more detail. In exploring the causes and effects of welfare state redistribution in the developed countries and middle income countries, the literature has increasingly moved towards more disaggregated measures of social policy, an enterprise in which the Leiden LIS Budget Incidence Fiscal Redistribution Dataset on Relative Income Poverty 2019, with its detailed data on income taxes and social contributions and a large number of individual social benefits, offers a rich source of information.

Research could focus on households with very low income — those in poverty. The budget incidence approach based on LIS data allows researchers to employ all kinds of cross-national analyses. How well is social expenditure targeted to the poor? Moreover, with LIS data on fiscal redistribution research is able to analyze differences in antipoverty approaches of countries (Europe versus the United States) and/or to judge the effectiveness of poverty reduction by income taxes and transfers across countries.

The assembled databank of poverty alleviation can be used by scholars and policy analysts to study the effects of different kind of programs on poverty, income adequacy in retirement, and the distribution of economic well-being generally.

## Content dataset 2019

This data set offers a number of measures of relative poverty and poverty alleviation via T/B-systems in the developed and middle income countries, drawing upon data from 339 *Luxembourg Income Study* surveys conducted in 49 countries between 1967 and 2016 (6,588,391 disposable income observations). In this dataset we have computed several kinds of results, namely poverty rates before social transfers and income taxes, poverty rates after social transfers and income taxes, the overall poverty reduction effect, the partial effect of redistribution by several social transfers and the partial effect of redistribution by income taxes and social security contributions.

- ♥ We offer a user-friendly version of the database allowing users to easily select relative poverty variables and poverty alleviation variables for (a group of) countries and/or specific data years via pivot tables. Somewhat arbitrary we labeled countries as follows:

*Anglo-Saxon* (3): Australia, Canada and United States;

*EU15* (14): Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Spain, Sweden and United Kingdom;

*CEE* (7): Czech Republic, Estonia, Hungary, Lithuania, Poland, Slovakia and Slovenia;

*Europe – other* (5): Georgia, Iceland, Norway, Serbia and Switzerland;

*BRICS* (5): Brazil, China, India, Russia and South Africa;

*Latin America* (10): Chile, Colombia, Dominican Republic, Guatemala, Mexico, Panama, Paraguay, Peru and Uruguay;

*Middle East* (2): Egypt and Israel;

*South-East Asia* (3): Japan, South Korea and Taiwan.

- ♥ The LIS staff implemented a major LIS Database template revision linked to the release of the Wave VII (centered on 2007) microdata. Most components of this revised template have also been applied, retroactively, to all earlier waves of the microdata. The revised template increased both comparability over-time and cross-national. As a result, most figures of our assembled dataset on poverty alleviation are – unfortunately – not directly comparable with the figures produced before. To obtain a consistent time-series, all calculations were done using the new 2011 LIS Template.
- ♥ A decomposition of relative poverty rates by income source.

Based on the current assembled dataset, we explore how relative poverty rates have evolved across countries and over time and what effects of poverty alleviation via T/B-systems are. Our dataset offers a number of measures of relative poverty and poverty alleviation in developing and middle income countries, namely:

- 1) LIS descriptives: Median and mean equivalized income, gross versus net information of income and the number of observation for each wave (= 339 datasets; 49 countries over time; 6,588,391 disposable income observations).  
[Table A1 in Excel Spreadsheet; a pivot table allows users to select countries and/or specific data years]
- 2) A measure of the extent of people lifted out of poverty by fiscal redistribution, as reflected in the difference between the poverty rate of pre-tax-transfer primary income and post-tax-transfer disposable income. We offer measures of both absolute poverty alleviation ( $\text{Poverty}_{\text{pri}} - \text{Poverty}_{\text{dhi}}$ ) and relative poverty alleviation ( $(\text{Poverty}_{\text{pri}} - \text{Poverty}_{\text{dhi}}) / \text{Poverty}_{\text{pri}}$ ). All figures are presented for several poverty thresholds (PL40, PL50 and PL60). Moreover, figures for the average normalized poverty gap (FGT(1)) are presented, applied to a threshold of 60 percent of median income.  
[Table A2 in Excel Spreadsheet; a pivot table allows users to select countries and/or specific data years]
- 3) Poverty rates (pre-tax-transfer primary income and post-tax-transfer disposable income) are presented for age-groups: Total population, Working-age population, Children and the Elderly.  
[Table A3 in Excel Spreadsheet; a pivot table allows users to select countries and/or specific data years]
- 4) Poverty rates of disposable income are presented for males and females as well.  
[Table A4 in Excel Spreadsheet; a pivot table allows users to select countries and/or specific data years]
- 5) The average size of social transfers as a proportion of households' pre-tax income (gross income), and a summary index of the degree to which transfers are targeted toward low-income groups. Our measure ranges from -1.0 (the poorest recipient receives all transfer income) to +1.0 (the richest recipient receives all transfer income).  
[Table A5 in Excel Spreadsheet; a pivot table allows users to select countries and/or specific data years]

In order to disentangle relative poverty even further by income source two additional statistics are provided for:



- 6) The budget size that is associated with several social transfers. The average size of a social transfer is defined as a proportion of households' gross income (codes refer to LIS Household Income Components List; see Annex A for details):
- a) Old-age/disability/survivor transfers (hitsil+hitsup+hitsudi+hitsap)
  - b) Sickness transfers (hitsissi+hitsiswi)
  - c) Family/children transfers (hitsisma+hitsufa+hitsafa)
  - d) Education transfers (hitsued+hitsaed)
  - e) Unemployment transfers (hitsisun+hitsuun+hitsaun)
  - f) Housing transfers (hitsaho+hitsahe)
  - g) General/food/medical assistance transfers (hitsagen+hitsafo+hitsame)
  - h) Other transfers (all social transfers minus transfers a to g)
  - i) Income taxes and social security contributions (hxit)
- [Table A6 in Excel Spreadsheet; a pivot table allows users to select countries and/or specific data years]

- 7) A measure of the extent of people lifted out of poverty by fiscal redistribution that is associated with several social transfers and income taxes and social security contributions (codes refer to LIS Household Income Components List; see Annex A for details):
- a) Old-age/disability/survivor transfers (hitsil+hitsup+hitsudi+hitsap)
  - b) Sickness transfers (hitsissi+hitsiswi)
  - c) Family/children transfers (hitsisma+hitsufa+hitsafa)
  - d) Education transfers (hitsued+hitsaed)
  - e) Unemployment transfers (hitsisun+hitsuun+hitsaun)
  - f) Housing transfers (hitsaho+hitsahe)
  - g) General/food/medical assistance transfers (hitsagen+hitsafo+hitsame)
  - h) Other transfers (all social transfers minus transfers a to g)
  - i) Income taxes and social security contributions (hxit)
- All results are presented for age-groups: Total population, Working-age population, Children and the Elderly.
- [Table A7 in Excel Spreadsheet; a pivot table allows users to select countries and/or specific data years]

For 334 out of all 339 LIS datasets, we are able to decompose the effect of lifted out of poverty by fiscal redistribution into partial effects of one to seven social transfer programs and income taxes and social security contributions mentioned above. Unfortunately, in Austria (1995 and 1987) and Spain (1980) data of the social programs are not available at all. China (2013) and Taiwan (1995) are not computed as they miss information on total social security transfers and income taxes and social security contributions.

The data set presents the results of the decomposition of relative poverty and the poverty reduction via several social transfers and income taxes and social contributions for LIS countries. Some benefits or income taxes do not have any antipoverty 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 exist, but does not have any antipoverty effect, because the social expenditures of this program is rather low or the program is distributed equally among the population (noted as 0%). In all tables, when Gross/net information is marked as "net", the redistributive effect of income taxes and social contributions is represented as blanks. It should be noted that LIS allocate social transfers to several categories (see above and in Tables A5 and A6 of our Excel Spreadsheet). Unfortunately, the category *Old-age/disability/survivor*

*transfers* cannot be further divided into old-age, disability and survivor transfers distinctively as part of the variable *hitsil* does not contain more specific income sources; see Annex A.

Results should be interpreted with caution because the antipoverty effect of the category *Other transfers* (= transfers not allocated to a specific category) amounts 25 percent and over of total transfer redistribution for several countries and years. This high share of the category *Other transfers* is the case for 58 datasets (out of 334) concerning 21 countries (out of all 49): Canada (1971, 1981, 1994, 1997, 1998, 2000, 2004, 2007, 2010, 2013), China (2002), Colombia (2007, 2013), Denmark (1987, 1992), Dominican Republic (2007), Estonia (2000), Germany (1973), Guatemala (2014), Ireland (1987), Israel (1979), Japan (2008), Mexico (1994, 1996, 2002, 2004, 2008, 2010, 2012), Netherlands (1987), Norway (1979, 1986), Slovenia (1997, 1999, 2004, 2007, 2010, 2012), South Korea (2006, 2008, 2010, 2012), Spain (1985), Sweden (1975, 2005), Taiwan (1981, 1986, 1991, 1997, 2000, 2005, 2007, 2010, 2013, 2016), the United Kingdom (1986, 1991) and Uruguay (2004). Of course, high figures for transfers not allocated to a specific category (the category *Other transfers*) are somewhat troublesome in our decomposition analysis of poverty alleviation, especially when LIS allocates less to this category over time due to higher data quality.

For the breakdown of poverty among males and females, we had to combine (merge) household files of LIS with files on persons. In most cases we did not have any troubles. 174 cases out of all 1,356 possibilities (= 339 data points of countries/ years for each Total population, Working-age population, Children and the Elderly) should be treated with caution, because the merged files did not (exactly) produce the same poverty rate as the household files, which is troublesome. We present the deviations in separate columns. Moreover, in some LIS files the breakdown of the population by gender is not fully possible – this is presented as ‘unknown’ share of population being male or female.

The treatment of pensions needs special attention. Public pension plans are generally seen as part of the safety net, generating large antipoverty effects through transfers and income taxes (social contributions). So, state old-age pension benefits will be included in our analysis on relative poverty. But countries differ to a large extent in public versus private provision of their pensions (OECD, 2008:120). Occupational and private pensions are not antipoverty 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. 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 income taxes. Overcoming this bias requires a choice: should pensions be earmarked as primary income or as a transfer? We deal with this bias rather pragmatically by following LIS Household Income Variables List (LIS, 2017): occupational and mandatory private pensions are earmarked and treated as social security transfers; see Annex A for details.

**Choice of income unit:** see section 3.4 main text

**Gross and net income datasets in LIS:** see section 3.2 main text

**Measuring the antipoverty effects of social transfers and income taxes:** see section 3.1 main text

**Countries and other measurement issues:** see section 3.6 main text

## Origin of the idea

The original database on Fiscal Redistribution based on LIS data was initiated by Jesuit & Mahler in 2004 ([LIS Working Paper #392](#)). This Leiden Budget Incidence Fiscal Redistribution Dataset on Relative Income Poverty Rates 2019 extends their Fiscal Redistribution approach. LIS data allows us to decompose the trajectory of poverty before social transfers and income taxes (primary income) to poverty after social transfers and income taxes (disposable income) in several parts: the dataset distinguish 7 main different social benefits and several income taxes and social contributions across countries.

Jesuit & Mahler (2004 and 2017) and Mahler & Jesuit (2006) divided overall government redistribution only into 3 components: the redistributive effects from unemployment benefits, from pensions, and from income taxes. They applied their empirical exercise for 13 countries with LIS-data around the years 1999/2000 (59 datasets). Wang & Caminada (2011a and 2011b) assembled a comparable dataset for 36 LIS-countries for the period 1979-2006 (177 datasets). Overall government redistribution was divided into 13 components. Recently Wang & Caminada (2017) assembled the Leiden LIS Budget Incidence Fiscal Redistribution Dataset on Income Inequality 2017, which covers a much wider range of 49 countries using the latest LIS data available (293 datasets). Data on disposable income e.g. is available for 5,653,573 individual disposable income observations summarized over all countries and waves. The current databank elaborates on this and focuses on the disentanglement of *relative income poverty rates*, while the datasets mentioned above concentrated on several aspects of primary and disposable income inequality.

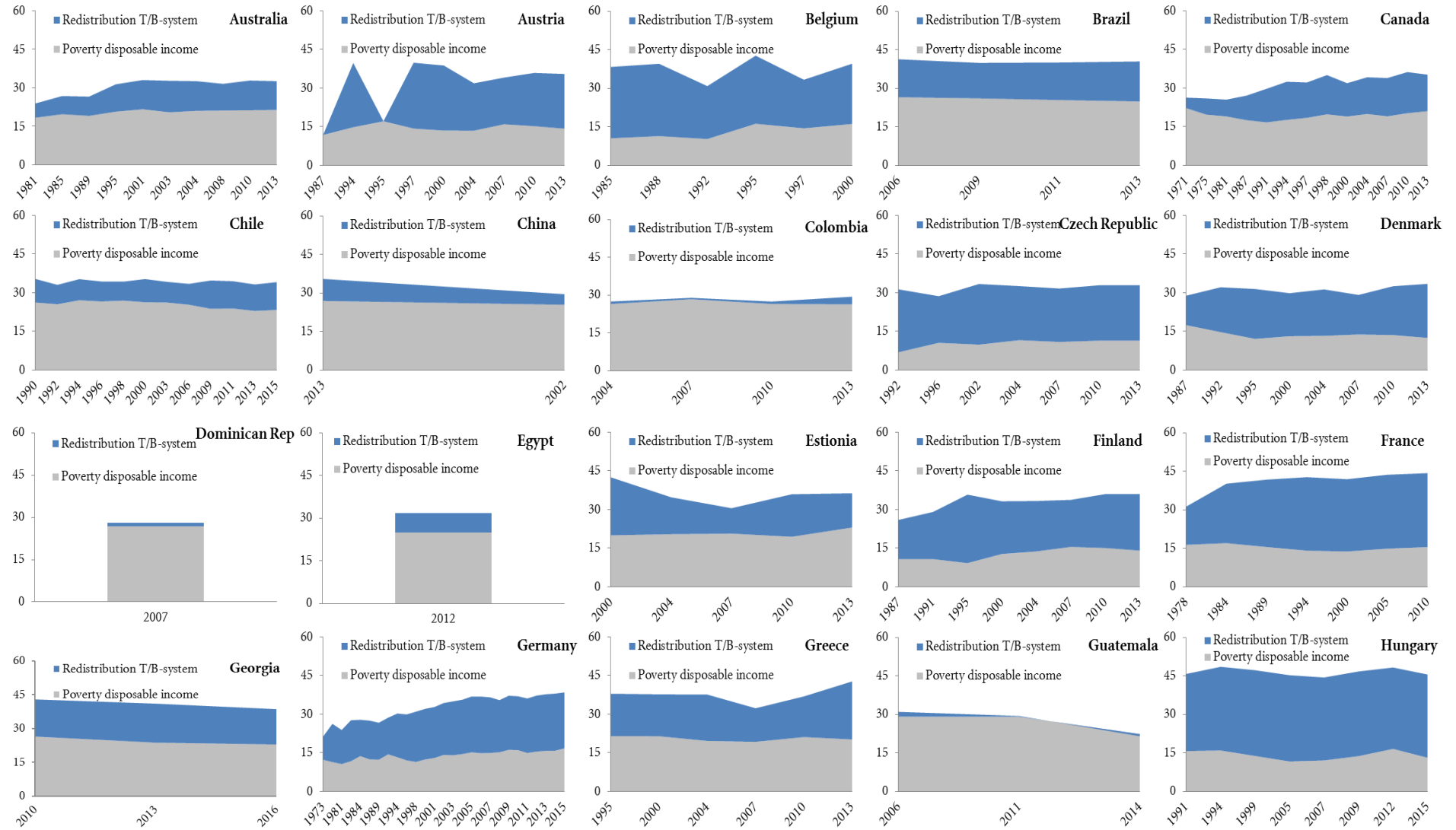
## Comparability of fiscal redistribution datasets 2005/2008, 2011 and 2017-2019

LIS has, for 35 years, grown and evolved in order to adapt to the needs of researchers throughout the world. The LIS staff implemented a major LIS Database template revision – referred to as the 2011 Template – linked to the release of the Wave VII (centered on 2007) microdata. Most components of this revised template have also been applied, retroactively, to all earlier waves of the microdata.

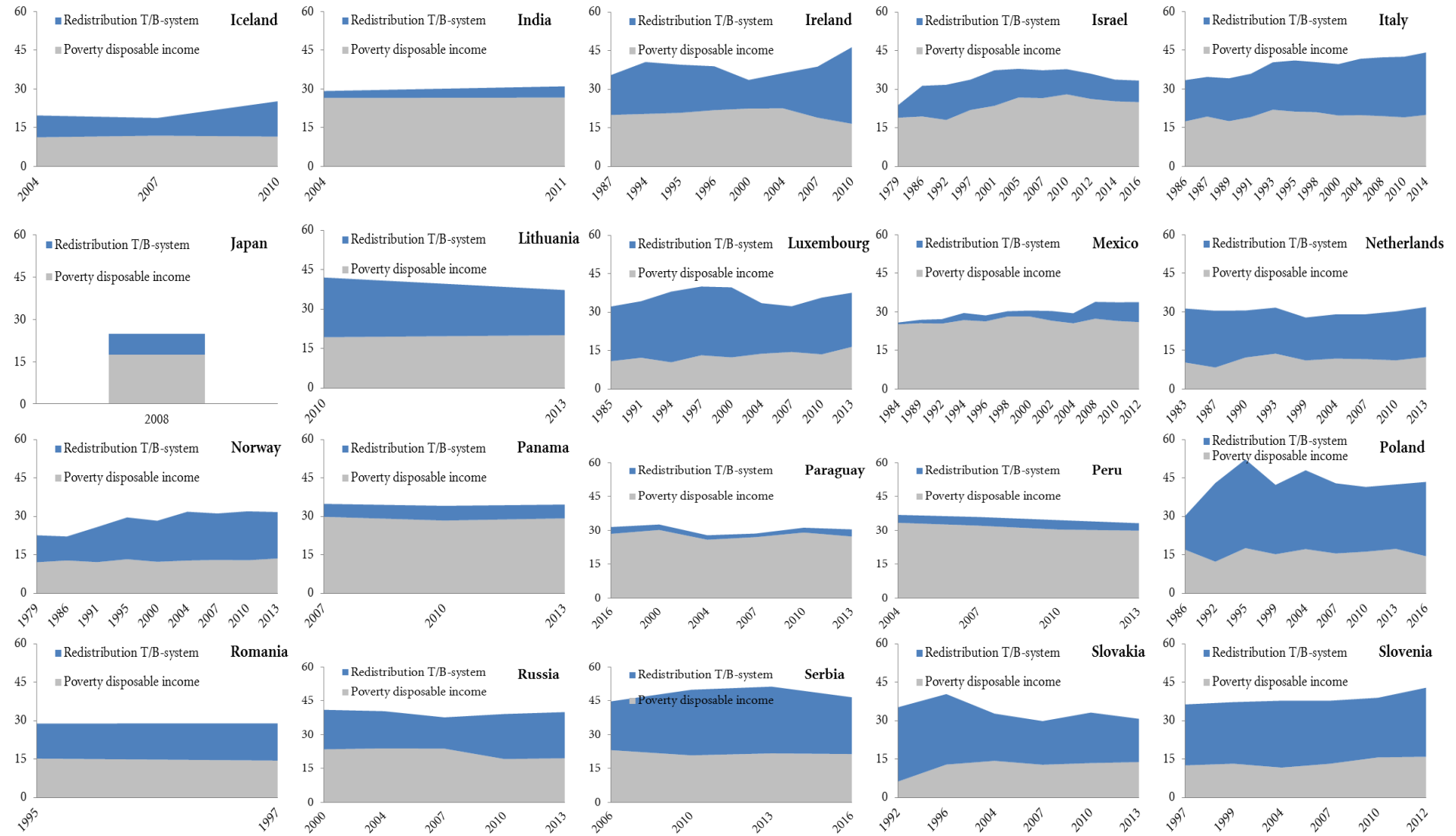
Especially the inclusion of an increasing number of datasets from middle-income countries by the LIS staff necessitated conceptual adjustments and changes to the list of harmonized variables into the 2011 Template. The revision by LIS was guided by several principles and goals (Gornick et al, 2013): (1) to restructure the variables, especially the income variables, to achieve a more logical, comparable, and comprehensive list; (2) to standardize most of the variables, which led to the use of fewer country-specific codes; and (3) to introduce easy-to-use dummy or categorical variables to complement the more detailed ones that are still provided. The revised 2011 LIS Template increased both comparability over-time and cross-national. Moreover, LIS' data users have to make fewer assumptions and do less recoding as they carry out their research. A drawback of the new 2011 LIS Template is that results obtained today for income, poverty, income inequality and fiscal redistribution are not comparable with results obtained before 2011.

	Fiscal Redistribution Dataset	Budget Incidence Fiscal Redistribution Dataset	Budget Incidence Fiscal Redistribution Dataset on Income Inequality	Idem, on Relative Income Poverty Rates
Assembled Launch / Last Update # Countries Countries	David Jesuit & Vincent Mahler August 2005 / February 2008 13 Australia, Belgium, Canada, Denmark, Finland, France, Germany, Netherlands, Norway, Sweden, Switzerland, United Kingdom, United States	Chen Wang & Koen Caminada August 2011 36 Australia, Austria, Belgium, Brazil, Canada, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Guatemala, Hungary, Ireland, Israel, Italy, Korea, Luxembourg, Mexico, Netherlands, Norway, Peru, Poland, Romania, Russia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, United Kingdom, United States, and Uruguay.	Jinxian Wang & Koen Caminada November 2017 47 Australia, Austria, Belgium, Brazil, Canada, China, Colombia, Czech Republic, Denmark, Dominican Rep, Egypt, Estonia, Finland, France, Germany, Georgia, Greece, Guatemala, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Luxembourg, Mexico, the Netherlands, Norway, Panama, Paraguay, Peru, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, UK, USA, and Uruguay.	Koen Caminada & Jinxian Wang February 2019 49 Idem + Chili and Lihouania
# LIS Waves	I, II, III, IV and V	I, II, III, IV, V and VI	I, II, III, IV, V, VI, VII, VIII and IX	I, II, III, IV, V, VI, VII, VIII, IX and X
Time-series # LIS Datasets	1979-2002 59	1979-2006 177	1967-2014 293	1967-2016 339
Redistribution from	Unemployment benefits Pensions Direct income taxes	Sickness benefits (V16) Occupational injury and disease benefits (v17) Disability benefits (v18) State old-age and survivors benefits (v19) Child/family benefits (v20) Unemployment compensation benefits (v21) Maternity and other family leave benefits (v22) Military/veterans/war benefits (v23) Other social insurance benefits (v24) Social assistance cash benefits (v25) Near-cash benefits (v26) Mandatory payroll income taxes (v7+v13) Income taxes (v11)	Old-age/disability/survivor transfers (hitsil+hitsup+hitsudi+hitsap) Sickness transfers (hitsissi+hitsiswi) Family/children transfers (hitsisma+hitsufa+hitsafa) Education transfers (hitsued+hitsaed) Unemployment transfers (hitsisun+hitsuun+hitsaun) Housing transfers (hitsaho+hitsahe) General/food/medical assistance transfers (hitsagen+hitsafo+hitsame) Other transfers Income taxes and social security contributions (hxit)	Idem
LIS Working Paper Availability Reference	<a href="http://www.lisdatacenter.org/">LIS Working Paper #392</a> <a href="http://www.lisdatacenter.org/">http://www.lisdatacenter.org/</a> Mahler VA & Jesuit DK (2006), Fiscal redistribution in the developed countries: new insights from the Luxembourg Income Study, <i>Socio-Economic Review</i> 4 483–511.	LIS Working Paper # 567 <a href="http://www.economie.leidenuniv.nl">www.economie.leidenuniv.nl</a> Wang C & Caminada K (2011a), Disentangling income inequality and the redistributive effect of social transfers and income taxes in 36 LIS countries, <i>LIS Working Paper #567</i> .	LIS Working Paper # 724 <a href="http://www.economie.leidenuniv.nl">www.economie.leidenuniv.nl</a> Caminada K, Wang J, Goudswaard K & Wang C (2017), Income inequality and fiscal redistribution in 47 LIS countries (1967-2014), <i>LIS Working Paper #724</i> .	LIS Working Paper # ??? <a href="http://www.economie.leidenuniv.nl">www.economie.leidenuniv.nl</a> Caminada K, Wang J, Goudswaard J & Wang C(2019), Relative income poverty rates and poverty alleviation via tax/benefit systems in 49 LIS countries (1967-2016), <i>LIS Working Paper</i> .

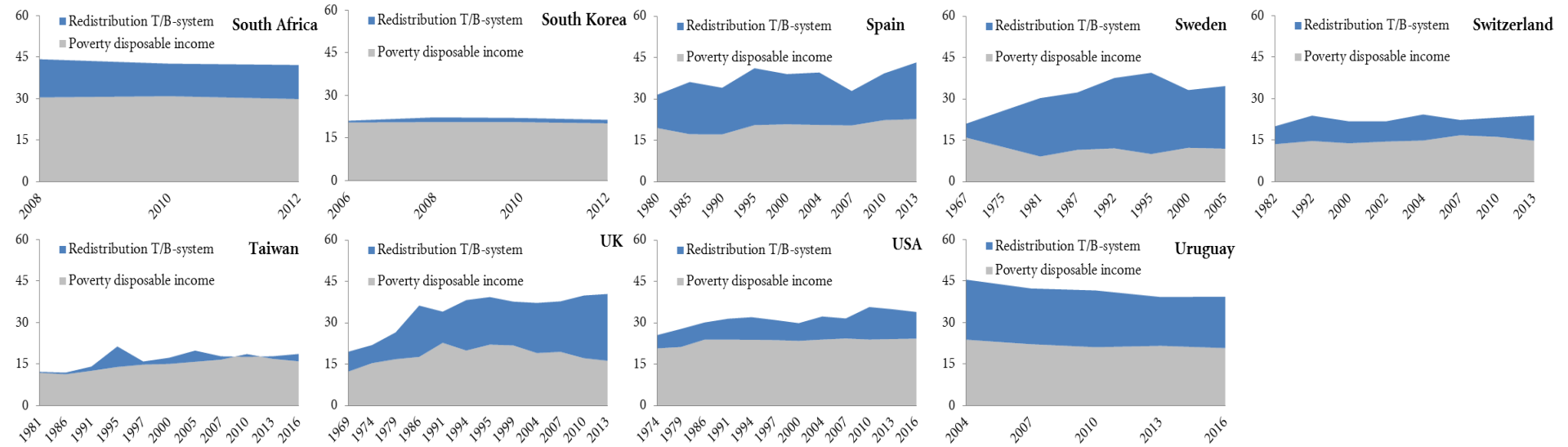
## Relative poverty and poverty alleviation via social transfers and income taxes in 49 LIS countries 1967-2016



## Relative poverty and poverty alleviation via social transfers and income taxes in 49 LIS countries 1967-2016



## Relative poverty and poverty alleviation via social transfers and income taxes in 49 LIS countries 1967-2016



## Annex A1: Household Income Components List

Table A1 presents the framework for accounting relative income poverty and redistribution through various income sources. Below we provide the household income components list of LIS, by variable name and meaning. More specific explanation of the data can be found in the user-friendly LIS website (<http://www.lisdatacenter.org/>). In Table A2 household (pre-tax) income is divided into 3 parts: factor income (labor income + capital income), social security transfers and private transfers. In each part, there are more specific income sources, which can be helpful for studies focusing on different elements of income. Table A3 provides household aggregated income sources provided by LIS. Using those aggregated variables, it is more convenient to process and present income distribution and decomposition results.

In this Leiden Budget Incidence Fiscal Redistribution Database on Relative Income Poverty 2019 we compute five kinds of results, namely income poverty before social transfers and income taxes, income poverty after social transfers and income taxes, the overall antipoverty effect, the partial effect by several transfers and income taxes. In calculating pre-tax-transfer income poverty, we use primary income, which consists of factor income (sum of labor income and capital income), and private transfers; gross income is equal to primary income plus social security transfers; in calculating post-tax-transfer income, we use net disposable income (dhi). Difference between  $Poverty_{pri}$  and  $Poverty_{gross}$  is the poverty alleviation via social transfers while difference between  $Poverty_{gross}$  and  $Poverty_{dhi}$  is the poverty alleviation from income taxes and social security contribution. For some countries and waves which only report net incomes, gross income is equal to net disposable income (dhi). In addition, we use the number of persons in a household (nhhmem) and household weight (hwgt) in LIS dataset so as to obtain equivalized income and weighted results.

**Table A1 Income distribution indicator list**

Income Poverty Indicator	Poverty Alleviation Measurement	Specific Income Source
Poverty (pri)		Primary Income (factor+hitp)
Transfers Redistribution	Poverty (pri)-Poverty (pri+trans)	
Poverty (pri+trans)		Primary Income + social security transfers (factor+hitp+hits)
Income taxes Redistribution	Poverty (pri+trans)-Poverty (dhi)	
Poverty (dhi)		Net disposable Income (dhi)
Overall Redistribution	Poverty (pri)-Poverty (dhi)	

Source: LIS



**Table A2 Household income variables in LIS dataset**

Factor income	HILERB	basic wages and salaries	<b>HILER</b> regular paid employment income	<b>HILE</b> paid employment income	<b>HIL</b> labor income
	HILERS	wage supplements			
	HILERD	director wages			
	HILEC	casual paid employment income			
	HILSF	farm self-employment income			
	HILSNB	profit from businesses	<b>HILSN</b> non-farm self- employment income		
	HILSNH	household production activities			
	HICIDI	Interest			
	HICIDD	Dividends	<b>HICID</b> interest and dividends		<b>HIC</b> capital income
	HICVIP	voluntary individual pensions			
	HICRENR	rental income from real estate	<b>HICREN</b> rental income		
	HICRENL	rental income from land			
	HICRENM	rental income from machinery			
	HICROY	Royalties			
<b>HITP</b> Private transfers	HITPED	merit-based education transfers			
	HITPNP	transfers from non-profit institutions			
	HITPIHA	alimony/child support		<b>HITPIH</b> interhousehold transfers	
	HITPIHR	Remittances			
	HITPIHFT	other family transfers			
<b>HITS</b> Social security transfers	HITSILMIP	mandatory individual pensions		<b>HITSIL</b> long-term insurance transfers	<b>HITSI</b> work- related insurance transfers
	HITSILO	occupational pensions			
	HITSILEPO	old-age insurance public pensions	<b>HITSILEP</b> employment-related public pensions		
	HITSILEPD	disability insurance public pensions			
	HITSILEPS	survivors insurance public pensions			
	HITSILWI	work-injury pensions			
	HITSISSI	sickness wage replacement		<b>HITSIS</b> short-term insurance	
	HITSISMA	maternity/parental wage replacement			
	HITSISWI	work-injury wage replacement			
	HITSISUN	unemployment wage replacement			
	HITSUPO	old-age universal pensions		<b>HITSUP</b> old- age/disability/survivors universal pensions	<b>HITSU</b> universal benefits
	HITSUPD	disability universal pensions			
	HITSUPS	survivors universal pensions			
	HITSUUN	unemployment universal benefits			
	HITSUDI	disability universal benefits			
	HITSUFACA	child allowances		<b>HITSUFA</b> family/child universal benefits	
	HITSUFAAM	advance maintenance			
	HITSUFACC	non-work related child care benefits			
	HITSUED	education-related universal benefits			
	HITSAGEN	general social assistance			<b>HITSA</b> assistance benefits
	HITSAPO	old-age assistance pensions		<b>HITSAP</b> old-age/disability/ survivors assistance pensions	
	HITSAPD	disability assistance pensions			
	HITSAPS	survivors assistance pensions			
HITSAUN	unemployment assistance				
HITSAFA	family/maternity/child assistance				
HITSAED	education assistance				
HITSAHO	housing assistance				
HITSAHE	heating assistance				
HITSAFO	food assistance				
HITSAME	medical assistance				

Detailed information via <http://www.lisdatacenter.org/wp-content/uploads/our-lis-documentation-variables-list.pdf>

Source: LIS

**Table A3 Household aggregated income variables in LIS dataset**

Name	Label	Definition
DHI	disposable household income	Total monetary and non-monetary current income net of income taxes and social security contributions.
FACTOR	factor income	Total current monetary and non-monetary income from labor and capital (HIL+HIC).
HITS	social security transfers	Total current monetary and non-monetary social security transfers
HITP	private transfers	Total current monetary and non-monetary private transfers.
HXIT	income taxes and social security redistribution	Total monetary and non-monetary expenditures on income taxes and social security contributions.
HITSIL+HITSUP +HITSUDI+HITS AP	old-age/disability/survivor transfers	1) Monetary long-term work-related insurance transfers from the public social security system and/or from private insurers through monetary long-term work-related insurance transfers from the public social security system and/or from private insurers through mandatory schemes, and from the employers or occupational organizations (occupational schemes), which cover mainly the active population. 2) Pensions and monetary transfers for old-age, disability and survivors from the public programs, which are universal in structure. 3) Monetary disability-related transfers from public programs, which are universal in structure. Such transfers cover people in connection with disability, sickness or injury. 4) Pensions and similar monetary transfers for old-age, disability and survivors, received from the state through social programs targeted towards individuals or households in need.
HITSISSI+HITSIS WI	sickness transfers	1) Short-term work-related insurance monetary transfers from sickness insurance schemes that cover mainly the active population. Such transfers replace or supplement employment income during periods of temporary interruptions (or reductions) of employment caused by temporary inability to work due to (non-work related) sickness or injury, or cover the additional costs incurred in such circumstances (e.g. rehabilitations benefits). 2) Short-term insurance monetary transfers for temporary total or partial work inability caused by a work-injury or occupational disease, stemming from schemes specifically set up with the purpose of covering work-injury and occupational diseases.
HITSISMA+HITS UFA+HITSFA	family/children transfers	1) Short-term work-related monetary insurance transfers from maternity, paternity, or parental leave insurance schemes. 2) Monetary family-related transfers from public programs, which are universal in structure. 3) Monetary and non-monetary family-related transfers received from the state through social programs that are targeted on individuals or households in need.
HITSUED+HITS AED	education transfers	1) Monetary education-related transfers from public programs, which are universal in structure. 2) Monetary and non-monetary education-related transfers received from the state through social programs that are targeted on individuals or households in need.
HITSISUN+HITS UUN+HITSAUN	unemployment transfers	1) Short-term monetary transfers from the unemployment insurance aimed to compensate for the partial or total loss of labor income and to help the job seeker integrate the labor market. 2) Monetary transfers from unemployment public programs, which are universal in structure. 3) Monetary transfers received from unemployment social programs that are targeted on individuals or households in need.
HITSAHO+HITS AHE	housing transfers	1) Monetary and non-monetary housing-related transfers received from the state through social programs that are targeted on individuals or households in need. 2) Monetary and non-monetary heating-related transfers received from the state through social programs that are targeted on individuals or households in need.
HITSAGEN+HIT SAFO+HITSAME	General/food/medical assistance transfers	1) Monetary transfers from minimum income guarantee systems/last resort systems, received from the state through social programs that are targeted on individuals or households in need. 2) Monetary and non-monetary food-related transfers received from the state through food assistance programs that are targeted on individuals or households in need. 3) Monetary and non-monetary health-related transfers received from the state through medical care programs that are targeted on individuals or households in need.

*Notes:*

- Old-age/disability/survivor transfers: in some cases the variable HITSIL is missing but its sub-components are available, we then use its sub-components (sum of HITSILMIP, HITSILO, HITSILEP and HITSILWI) instead, including CA13, CA10, CA07, CA04, CA00, CA98, CA97, CA94, CA91, CA87, CA81, CA75, CA71, DK92, DK87, JP08. In other cases, HITSIL and its sub-components, together with variables HITSUP, HITSUDI AND HITSAP are missing or provides poor information while the variables in the additional set 1 in the LIS variable list are available. In such cases old-age/disability/survivor transfers are computed based on sum of HIATOLD, HIATDIS

and HIATSUR, including EE13, EE10, EE07, EE04, GR04, GR00, GR95, IS10, IS07, IS04, LU04, NL04, NO13, NO10, NO07, NO04, NO00, NO95, RU00, ES04, SE00.

- Sickness transfers are computed based on the variable HIATSIC in the additional set1 in LIS variable list in IS10, IS07, IS04, LU04, UK13, UK10, UK07.
- Family/children transfers are computed based the variable HIATFAM in the additional set1 in LIS variable list in AT04, CA07, EE04, GR04, IS10, IS07, IS04, LU04, RU13, RU10, RU07, RU04, RU00, ES04.
- Education transfers are computed based the variable HIATEDU in the additional set1 in LIS variable list in IT14, IT10, IT08, LU04, US13, US10, US07, US04, US00, US97, US94, US91.
- Unemployment transfers are computed based the variable HIATFAM in the additional set1 in LIS variable list in AT04, LU04, ES04, ES90, ES85.
- Housing transfers are computed based the variable HIATHOU in the additional set1 in LIS variable list in GR10, GR07, LU04, RU00.

Variable construction via <http://www.lisdatacenter.org/our-data/lis-database/documentation/>.

Source: LIS

## **Annex A2: Gross and net income datasets in LIS**

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) 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 Table A4 for a specification.

To compare LIS gross and net datasets, researchers can apply at least four different approaches. The first approach includes both gross and net datasets in the same comparative analysis, acknowledging that the incomparabilities may lead to biased results (e.g. Wang et al, 2012; Wang et al, 2014). The second approach is to restrict analyses to either gross or net datasets (e.g. Gornick & Jäntti, 2012). This will result in accurate findings but limits the scope of the analyses. Third, one can present separate analyses based on LIS gross and net datasets (e.g. Wang et al, 2014). However, the limitation of this approach is that the different results using gross and net datasets could originate from the different income concepts, or from real differences across countries or both. The fourth strategy is to gross up net income data or net down gross income data. With LIS, grossing up is not possible as most net datasets do not contain information on income taxes. To estimate gross income, country-specific details on the tax systems are required. Instead, Nieuwenhuis et al (2016) come up with a net down procedure to modify income data to approximate net income data. One shortcoming of this strategy is that in net datasets the comparison between pre-tax-transfer income and post-tax-transfer income only captures the effects of transfers, whereas in gross datasets this comparison would capture both effects of income taxes and transfers. We offer a user-friendly version of the database allowing users to easily select income poverty variables (gross and/or net) and fiscal redistribution variables for (a group of) countries and/or specific data years via pivot tables.

**Table A4 Gross and net income data in LIS**

	Gross	Net	Mixed	# sets
Australia	AU14, AU10, AU08, AU04, AU03, AU01, AU95, AU89, AU85, AU81			10
Austria	AT13, AT10, AT07, AT04	AT00, AT97, AT94	AT95, AT87	9
Belgium	BE97, BE92	BE00, BE95, BE88, BE85		6
Brazil	BR13, BR11, BR09, BR06			4
Canada	CA13, CA10, CA07, CA04, CA00, CA98, CA97, CA94, CA91, CA87, CA81, CA75, CA71			13
Chile		CL15, CL13, CL11, CL09, CL06, CL03, CL00, CL98, CL96, CL94, CL92, CL90		12
China	CN13		CN02	2
Colombia	CO04		CO13, CO10, CO07	4
Czech Republic	CZ13, CZ10, CZ07, CZ04, CZ02, CZ96, CZ92			7
Denmark	DK13, DK10, DK07, DK04, DK00, DK95, DK92, DK87			8
Dominican Rep.	DO07			1
Egypt		EG12		1
Estonia	EE13, EE10, EE07, EE04		EE00	5
Finland	FI13, FI10, FI07, FI04, FI00, FI95, FI91, FI87			8
France			FR10, FR05, FR00, FR94, FR89, FR84, FR78	7
Georgia		GE16, GE13, GE10		3
Germany	DE15, DE14, DE13, DE12, DE11, DE10, DE09, DE08, DE07, DE06, DE05, DE04, DE03, DE02, DE01, DE00, DE98, DE95, DE94, DE91, DE89, DE87, DE84, DE83, DE81, DE78, DE7			27
Greece	GR13, GR10, GR07	GR04, GR00, GR95		6
Guatemala	GT14, GT11, GT06			3
Hungary		HU15, HU12, HU09, HU07, HU05, HU99, HU94, HU91		8
Iceland	IS10, IS07, IS04			3
India		IN11, IN04		2
Ireland	IE10, IR07, IE04, IE87	IE00, IE96, IE95, IE94		8
Israel	IL16, IL14, IL12, IL10, IL07, IL05, IL01, IL97, IL92, IL86, IL79			11
Italy		IT14, IT10, IT08, IT04, IT00, IT98, IT95, IT93, IT91, IT89, IT87, IT86		12
Japan	JP08			1
Lithuania	LT13, LT10			2
Luxembourg	LU13, LU10, LU08, LU04	LU00, LU97, LU94, LU91, LU85		9
Mexico		MX12, MX10, MX08, MX04, MX02, MX00, MX98, MX96, MX94, MX92, MX89, MX84		12
Netherlands	NL13, NL10, NL07, NL04, NL99, NL93, NL90, NL87, NL83			9
Norway	NO13, NO10, NO07, NO04, NO00, NO95, NO91, NO86, NO79			9
Panama	PA13, PA10, PA07			3
Paraguay		PY16, PY13, PY10, PY07, PY00	PY04	6
Peru	PE13, PE10, PE07, PE04			4
Poland		PL92, PL86	PL16, PL13, PL10, PL07, PL04, PL99, PL95	9
Romania	RO97, RO95			2
Russia		RU13, RU10, RU07, RU04, RU00		5
Serbia		RS16, RS13, RS10, RS06		4
Slovak Republic	SK13, SK10, SK07, SK04, SK92	SK96		6
Slovenia		SI12, SI10, SI07, SI04, SI99, SI97		6
South Africa	ZA12, ZA10, ZA08			3
South Korea	KR12, KR10, KR08, KR06			4
Spain	ES13, ES10, ES07	ES04, ES00, ES95, ES90, ES85, ES80		9
Sweden	SE05, SE00, SE95, SE92, SE87, SE81, SE75, SE67			8
Switzerland	CH13, CH10, CH07, CH04, CH02, CH00, CH92, CH82			8
Taiwan	TW16, TW13, TW10, TW07, TW05, TW00, TW97, TW95, TW91, TW86, TW81			11
United Kingdom	UK13, UK10, UK07, UK04, UK99, UK95, UK94, UK91, UK86, UK79, UK74, UK69			12
United States	US16, US13, US10, US07, US04, US00, US97, US94, US91, US86, US79, US74			12
Uruguay		UY16, UY13, UY10, UY07, UY04		5
# LIS Datasets	214	103	22	339

See for a continuously updated overview: <http://www.lisdatacenter.org/our-data/lis-database/datasets-information/>