The relationship between different social expenditure schemes and poverty, inequality and economic growth

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Abstract In this article, we study how social expenditure is related to poverty, income inequality and GDP growth. Our main contribution is to disentangle these relationships by the following social expenditure schemes: 1) "old age and survivors", 2) "incapacity", 3) "health", 4) "family", 5) "unemployment and active labour market policies" and 6) "housing and others". For this purpose, we employ OLS and 2SLS regression models using a panel data set for 22 Member States of the European Union from 1990 until 2015. We find total public social expenditure to be negatively related to poverty and inequality, but not related to GDP growth. The results vary substantially between the different social expenditure schemes, which makes more accurate targeting possible.

Introduction

In the light of the work of Piketty (2014), and given further impetus by the rise of populist movements (Muis and Immerzeel, 2017), there has been a resurgence in the public and academic debate on income and wealth inequality (Connor

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et al., 2019). Previously, many policy-makers and academics assumed a trade-off between reducing income inequality and increasing GDP growth (Okun, 1975; Benabou, 2000; Arjona et al., 2003). Yet, other studies find no evidence for such a trade-off, and even find a negative association between income inequality and economic growth (Persson and Tabellini, 1994; Alesina and Rodrik, 1994; Perotti, 1996; Easterly, 2007; Berg et al., 2018). However, this negative association between inequality and growth cannot be taken to imply that higher levels of redistribution are related to higher economic growth. Looking to recent research, the empirical evidence does not support that redistribution is negatively related to economic growth (Thewissen, 2013; Berg et al., 2018). Nevertheless, redistribution is a broad concept and different kinds of redistribution (e.g. different social expenditure schemes) have different effects on poverty, inequality and economic growth.

In this article, we study how different social expenditure schemes are related to final values of the poverty rate and the Gini coefficient for income inequality, as well as to GDP growth. First, we investigate how social expenditure at the aggregated level is related to poverty, inequality and GDP growth. This analysis examines whether reducing poverty and inequality through total public social expenditure comes at the expense of economic growth. Second, we study how these relationships between "social expenditure" and "poverty, inequality and GDP growth" differ for social expenditure on 1) "old age and survivors", 2) "incapacity", 3) "health", 4) "family", 5) "unemployment and active labour market policies" (ALMPs), and 6) "housing and others". This analysis shows the importance of the different expenditure types for reducing poverty and inequality and stimulating GDP growth.

Our main contribution is to disentangle the relationships between total social expenditure and poverty, inequality and GDP growth for the different expenditure schemes. This allows to compare the different relationships for the different expenditure schemes and poverty, inequality and economic growth in a more systematic way. To our knowledge, our study is the first that uses this approach to contribute to the following two branches of the literature. First, we contribute to the literature that studies whether there is a trade-off between equity and efficiency. Our contribution to this literature is that we study which expenditure types are the most strongly negatively related to poverty and inequality while also being positively related to economic growth. Our second contribution is to study how the relationships between social expenditure and poverty, inequality and growth differ between expenditure schemes targeted at the poor and expenditure schemes with a more universal character. This contributes to the literature on the targeted (means-tested) versus the universal (comprehensive) approach to the welfare state (Korpi and Palme, 1998; Jacques and Noel, 2018).

We employ OLS and 2SLS regression models in which the lagged values of the different expenditure variables are used as explanatory variables. We use social expenditure in period (t-1) because social expenditure levels depend also on growth and potentially also on poverty and inequality. In our 2SLS model, we use the social expenditure variables in period (t-2) as our instrument. Our preferred model is an OLS model with panel corrected standard errors in which we correct for first order serial correlation and control for country and year fixed effects. We use a panel data set of 22 Member States of the European Union (EU) for the years 1990–2015 for our base results and a panel data set of 32 member countries of the Organisation for Economic Co-operation and Development (OECD) in our robustness analysis. The data are from several OECD databases.

Our main findings are as follows. First, we find total public social expenditure to be negatively related to poverty and inequality and not significantly related to GDP growth. Hence, there seems to be no trade-off between reducing poverty and inequality through social expenditure on the one hand and higher economic growth on the other hand. Second, the different social expenditure schemes are differently related to poverty, inequality and economic growth, which makes more accurate targeting possible. For poverty, we find negative relations with expenditure on 4) "family", 5) "unemployment and ALMPs", and 6) "housing and others".[1] For inequality, we find a strong negative connection with social expenditure on 1) "old age and survivors" and 2) "family". Finally, a strong positive relation with GDP growth is found for expenditure on 6) "housing and others".

The article continues as follows. We start by reviewing the literature on the effects (and mechanisms) of social expenditure on poverty, inequality and GDP growth. We then explain the data, methodology and results. We conclude with a discussion of the results.

Literature review

The effects of social expenditure on poverty and inequality. We expect social expenditure to reduce poverty and inequality (Kenworthy, 1999; Caminada and Goudswaard, 2009; Adema, Fron and Ladaique, 2014; ILO, 2014; Wang, Caminada and Goudswaard, 2014). Wang, Caminada and Goudswaard (2012) and Caminada et al. (2019) find that public pensions account for the largest reduction in income inequality, but also that social assistance, disability benefits, family benefits and unemployment benefits are negatively associated with income inequality. Wang, Caminada and Goudswaard (2012), Wang, Caminada and Goudswaard (2014) and Caminada et al. (2019) study redistribution by taking

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1. Social expenditure on "others" consists for the largest part of expenditure on social assistance.

the difference between market income and disposable income, which is a useful accounting exercise. Our approach is to run regression models in which we study the relationship between social expenditure and final values of the poverty rate and the Gini coefficient. One important advantage of our approach is that our effects also include the effects on market income, whereas these previous studies assume that redistribution does not affect market income.

We expect social expenditure types that are best targeted at the poor to have the largest negative effects on poverty. In contrast, the largest effects on income inequality, measured by the Gini index, are expected for social expenditure types with a more universal character. We expect universal expenditure types to have a stronger negative effect on the Gini (for income inequality) for the following two reasons. First, as a larger share of the population is benefiting, universal social expenditure types can count on higher public support, translating into higher levels of social expenditure (Korpi and Palme, 1998). Indeed, not only the targeting efficiency but also the budget size is important for reducing income inequality (Caminada et al., 2017). Second, the Gini coefficient is much more sensitive to the income groups in the middle of the income distribution than to the bottom or top of the income distribution.

In Table 1, we present the share of social cash benefits received by the five quintiles of the income distribution, based on 21 EU-SILC countries in 2015.[2] This table gives an indication of which social expenditure categories are best targeted at the poor. We find that housing and social exclusion benefits are those best targeted at the poor, with 52 per cent and 62 per cent of cash benefits, respectively, being received by the bottom 20 per cent of the income distribution.

Table 1. *Share of social benefits received by quintiles of the income distribution*

	Q1	Q2	Q3	Q4	Q5
Old-age benefits	11	17	19	22	30
Survivor benefits	19	21	21	18	20
Disability benefits	20	23	22	19	17
Family benefits	23	25	21	17	14
Unemployment benefits	24	20	17	18	22
Housing benefits	52	23	9	9	7
Social exclusion benefits	62	17	10	7	5

Notes: The calculations are based on equivalized disposable household income in 2015 for 21 of the 22 EU Member States in our sample, excluding Germany which is not available in EU SILC.

Source: Own calculations based on EU Survey on Income and Living conditions for European countries (EU-SILC).

2.   See Eurostat.

Thereafter, family benefits are best targeted, with 48 per cent going to the bottom 40 per cent and only 14 per cent to the highest 20 per cent. Disability benefits and unemployment benefits are distributed roughly equally over the five income quintiles. Social expenditure on old age is not targeted at the poor, with only 28 per cent of old-age cash benefits received by the bottom 40 per cent of the income distribution.

One expenditure type that we expect to be effective in reducing both poverty and inequality is family expenditure. This is firstly so because families are more often poor, as income must be shared with all household members, including children and non-working adult members. In line with this, poverty rates are higher among children than among adults in most countries. Second, due to economies of scale for larger households, it is relatively cheap to reduce the poverty rate by targeting on families. As regards the Gini, we expect a large negative effect from family social expenditure, because a large share of family social expenditure is received by the second and third quintiles of the income distribution; 25 per cent and 21 per cent of family expenditure, respectively. Increasing income for the second and third quintiles is expected to be relatively effective in reducing the Gini for income inequality because the Gini is relatively sensitive to the income groups in the middle of the income distribution.

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The effects of social expenditure on economic growth. The literature is divided on the effect of social spending on economic growth. On the one hand, Barro (1996) shows that government expenditure has a negative effect on economic growth and Arjona et al. (2003) find some evidence that social expenditure reduces growth. On the other hand, most studies reject the hypothesis that social expenditure has a negative impact on growth (e.g. Atkinson, 1995; Singh, 1996; Baldacci et al., 2008; Thewissen, 2013; Bakija et al., 2016; Berg et al., 2018). In line with this, Cingano (2014), OECD (2015) and Dabla-Norris et al. (2015) show that inequality reduces economic growth, suggesting that redistribution may increase growth.

Capital accumulation is one of the main mechanisms that can explain GDP growth rates (Solow, 1956). The effect on capital accumulation depends highly on the social insurance system in place. In a pay-as-you-go (PAYG) pension system, the expected effect of old-age expenditure on savings is negative, as less personal savings are needed when retirees receive a pension paid by the working-age population (Feldstein, 1974). In a capital-based system, premiums for social insurance may be higher than the amount people would have saved otherwise, which could increase investments and thereby economic growth.

Another main determinant of growth is labour supply. The welfare state typically decreases labour supply because the benefit of supplying labour decreases when the outside option becomes more attractive (Krueger and

Meyer, 2002; French and Song, 2014). Some studies find either no effect or a positive effect of social protection schemes on labour supply (Krueger and Pischke, 1992; Rust and Phelan, 1997). These studies show that the effects of welfare state programmes (e.g. retirement schemes) on labour supply can be explained in large part by the specific features of the social security system. For example, it is expected that the negative effects on labour supply are absent when benefits supplement market income rather than replace it, which is the case for many types of benefits. The largest negative effect on labour supply is expected for the social expenditure type "unemployment and ALMPs", as these target the working-age population and not children, the elderly or the disabled. Only people registered as unemployed are eligible for unemployment benefits, which creates a disincentive to work.

In addition to labour supply, the level of productivity is also important for economic growth. Social expenditure affects the level of productivity by two main mechanisms: it increases risk-taking behaviour and it reduces poverty. First, social protection decreases income risks, which may increase risk-taking, investments, productivity and thereby growth. Second, social expenditure increases productivity by reducing poverty. Health, work performance and even the cognitive capacity of the brain are negatively affected by poverty (Aber et al., 1997; Brooks-Gunn and Duncan, 1997; Banerjee, Benabou and Mookherjee, 2006; Mani et al., 2013). Hence, reducing poverty increases the capacities of poor people and thereby increases productivity and GDP growth. Not only poverty but also inequality can be detrimental to productivity. Increased income inequality depresses the development of skills among those whose parents have a lower education background (Cingano, 2014; OECD, 2014). The driver of this negative impact of inequality on growth is the gap between low-income households and the rest of the population. This suggests that targeting social expenditure at the poor would be most effective to increase productivity.

Finally, social expenditure is expected to have a positive and stabilizing effect on aggregate demand (Keynes, 1937; Blanchard and Leigh, 2013; Darby and Melitz, 2008). For this reason, we expect the largest positive effects on aggregate demand for the best targeted schemes, as lower-income households consume a higher share of their income.

Overall, for GDP growth, we expect the largest positive effects of targeted schemes when the most important mechanisms are an increase in risk-taking, releasing the potential of the poor, and increasing aggregate demand. Hence, we expect the largest positive effects on GDP growth from social expenditure on "housing and others", as these are best targeted at the poor; see Table 1. When we consider the size of the different social expenditure types, we expect large effects of expenditure on "old age and survivors" as this category is the most sizable.

Data

We use a panel data set for 22 EU Member States that are a member country of the OECD covering 26 years from 1990–2015.[3] The countries in our EU sample are Austria, Belgium, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and the United Kingdom. We employ the same analysis for a sample of 32 OECD countries in our robustness analysis. Selecting the period 1990–2015 allows us to consider the post-Soviet bloc states and provides a more balanced sample, as much less data are available for the years before 1990.

Our dependent variables are the final values of the poverty rate (poverty after taxes and transfers for a poverty line of 50 per cent),[4] final values of the Gini coefficient for income inequality (Gini for disposable income post taxes and transfers), and average GDP growth rate over three years [(growth(t) + growth (t +1) + growth(t+2))/3] (annual growth of GDP per capita, constant prices, in percentage). We use the average annual GDP growth rate over the next three years to reduce the endogeneity problem (Thewissen, 2013). The poverty rates and the Gini coefficients are taken from the Income Distribution Database (IDD) of the OECD and the GDP growth rates are taken from the Annual National Accounts data of the OECD.[5]

The explanatory variables of interest are social expenditure variables for which we use the OECD Social Expenditure Database (SOCX) (OECD, 2007).[6] We are aware that social expenditure variables have limitations in explaining the degree of social protection and generosity (De Deken, 2014; Van Vliet and Wang, 2015). First, differences in spending may reflect variation in demographic and socio-economic trends across countries. Second, expenditures neglect some important institutional characteristics of welfare state programmes, such as the extent to which welfare state programmes are means-tested. Third, gross social expenditure does not take the taxation of benefits into account. We deal with these problems by including year and country fixed effects and a large number of economic and demographic controls to control for different demographic and socio-economic trends and different institutional characteristics. We use gross social expenditure variables for our base results because not much data is

3. The data set is limited to EU Member States that are a member country of the OECD for reasons of data availability, but also because these countries are more similar in their characteristics, making the results more reliable.
4. The poverty rate for a poverty line of 50 per cent shows the ratio of the number of people whose income falls below half the median disposable equivalized household income of the population.
5. See OECD IDD, and OECD Annual National Accounts.
6. See OECD SOCX.

available on net social expenditure and no data is available on net social expenditure for the different expenditure categories. However, we perform the same analysis with the limited available data for net social expenditure in our robustness analysis. Overall, social expenditure variables are the most objective and most used variables for studying the effects of the welfare state.

Another issue is whether we should include old-age expenditure in total public social expenditure when we are interested in the redistributive effects of social expenditure. Most studies (e.g. the OECD studies) look at expenditure schemes targeted at the working-age population as regards poverty and inequality among this group. The main concern is whether pensions are about redistribution over the life cycle or about redistribution among people. Also of concern, cohort effects may blur the effects of social expenditure. We chose to look at different social expenditure types, including old-age expenditure, separately. Further, we look at the effects on poverty and inequality for the total population as well as for the working-age population. Furthermore, we control for demographics to ensure that the coefficients are not biased by cohort effects.

Our main explanatory variable is total public social expenditure (as a percentage of GDP), as the quality of public social expenditure data is the highest when we consider the different expenditure types, especially for the comparison over time. Total public social expenditure includes both cash and in-kind social expenditure. We also look at the effects of total public and mandatory private social expenditure and total social expenditure (including public, mandatory private and voluntary private) in the robustness analysis. The reason for this is that public and private social expenditure are close substitutes (Goudswaard and Caminada, 2010). Our total public social expenditure variable is separated by spending on 1) "old age and survivors", 2) "incapacity", 3) "health", 4) "family", 5) "unemployment and ALMPs" and 6) "housing and others", which are our next explanatory variables.[7]

Table 2 shows the descriptive statistics for poverty, inequality and GDP growth and the various social expenditure variables for our sample of EU Member States during the period 1990–2015. On average, 9.2 per cent of the population has an income below the poverty line of 50 per cent of the median income. Our indicator for inequality, the Gini coefficient, is on average 0.29 in this period. GDP growth is on average 2.4 per cent between 1990 and 2015. Table 2 also denotes the mean values and standard deviations for the different social expenditure variables. Total public social expenditure is on average 22.1 per cent of GDP, the largest part is going to "old age and survivors" (9.1 per cent of

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7.   This article is supplemented by an extensive online Appendix (Tables A.1–A.25) developed by the author and made available to readers (see Supporting Information). See Table A.1 for a more detailed description of these different categories of social expenditure.

Table 2. *Descriptive statistics: Dependent and explanatory variables 1990–2015 for EU sample*

Variable	Mean	Std. Dev.	Min	Max	Obs
Poverty	9.2	3.1	3.6	18.6	317
Gini	0.29	0.04	0.21	0.39	317
GDP growth	2.4	2.6	-7.3	13.0	555
Total public SE	22.1	4.5	11.1	34.7	534
Old age and survivors SE	9.1	2.7	3.1	17.1	535
Incapacity SE	2.6	1.1	0.8	5.9	535
Health SE	5.7	1.3	2.3	9.3	545
Family SE	2.2	0.9	0.3	4.5	535
Unemployment and ALMPs SE	1.8	1.2	0.1	6.1	533
Housing and others SE	0.7	0.5	0.0	2.2	521

Source: Own calculations based on EU Survey on Income and Living conditions for European countries (EU-SILC).

GDP) and "health" (5.7 per cent of GDP). Lower amounts are spent on "incapacity" (2.6 per cent of GDP), "families" (2.2 per cent of GDP), "unemployment and ALMPs" (1.8 per cent) and "housing and others" (0.7 per cent).

The control variables we use in our models for poverty and inequality are GDP per capita (measured in thousands of US dollars (USD), constant prices, 2010 PPPs), unemployment rate (harmonized), population share aged 15–64, population share aged 65+, and trade union density. The data are from OECD databases, except for population data sourced from the United Nations Department for Economic and Social Affairs (UN DESA).[8] We control for business cycle fluctuations and demographics, as these have an effect on both social expenditure and poverty and inequality. We consider trade union density as a control for labour market institutions, as trade unions may increase pressure to increase social expenditure and decrease poverty and inequality (Card, 2001; Hooghe and Oser, 2016).

In our models for GDP growth, we use the control variables population share aged 15–64, population share aged 65+, gross capital formation (annual growth rate), education (share of population attained tertiary education, aged 25–64), export (as per cent of GDP) and inflation (consumer price all items, annual percentage change). We add these control variables to our model as we expect them to have an effect on both social expenditure and on GDP growth. These

8. See UN DESA.

control variables are based on the work of Solow (1956), Barro (1996), Bellettini and Ceroni (2000), and Barro (2013). These data are from the OECD databases. (See the online Appendix, Table A.2 for the descriptive statistics of the control variables).

Empirical methodology

Endogeneity issues. We start this section by elaborating on the reverse causality issue. Not only can social expenditure have an effect on poverty, inequality and economic growth, but there can also be an effect the other way around. We expect a positive effect of poverty and inequality on social expenditure (Alesina and Rodrik, 1994; Arjona, Ladaique and Pearson, 2003; Milanovic, 2000; Lupu and Pontusson, 2011). This positive effect can be explained by the median voter who cares more about redistribution in instances where the possibilities and benefits of redistribution are larger – which is the case when poverty and inequality are more severe. This positive effect of poverty and inequality on social expenditure may cause a positive relation between social expenditure and poverty and inequality, leading to an underestimation of a negative effect of social expenditure on poverty and inequality. For economic growth, we expect a negative effect on social expenditure as a percentage of GDP, at least in the short term that we are studying. This is because, first, the denominator of social expenditure as a percentage of GDP per capita increases and, second, because social expenditure is negatively related to the business cycle. This negative effect of GDP growth on social expenditure (as a per cent of GDP) could translate into a negative relationship between social expenditure and GDP growth, leading to an underestimation of a potential positive effect of social expenditure on GDP growth. In short, the coefficients we will find are conservative estimates for the potential negative effects on poverty and inequality and potential positive effect on GDP growth.

We reduce the problem of reverse causality by using the social expenditure variables in period (t-1), as we expect that the dependent variables in period t cannot have an effect on the explanatory variables in period (t-1). We also check if the results are robust when we consider different time lags, up to a 5-year period lag, as reverse causality becomes less likely with a longer time lag. In line with the literature, we use the average annual GDP growth rate over the next three years [(growth(t) + growth(t+1) + growth(t+2))/3] as the dependent variable in the growth models to further reduce the endogeneity problem (Thewissen, 2013).

Besides, we use 2SLS regression models to correct for possible endogeneity. In the 2SLS model, we use the social expenditure variables in period (t-2) as instruments because we argue that social expenditure in period (t-2) has an effect on social expenditure in period (t-1) but no direct effect on poverty,

inequality and growth two periods later. We indeed find high F-statistics in the first stage indicating that the instrument is relevant. The exclusion restriction is harder to prove statistically, but it is plausible that the dependent variables poverty, inequality and growth are, in the first instance, affected by a change in social expenditure in the same period or the next period but less, or not at all, two periods later. Nevertheless, we prefer to be cautious by considering the 2SLS results jointly with the OLS estimates, as it is impossible to prove that social expenditure in period (t-2) has no direct effect on our outcome variables. The 2SLS estimates generally give very similar results to the OLS estimates, indicating that the effects are indeed due to social expenditure.

Our preferred model is an OLS regression model, which contains panel corrected standard errors and in which we control for first order serial correlation. In addition, we include year and country fixed effects to control for different demographic and socio-economic trends and different institutions. This model deals most extensively with possible simultaneity problems in which social expenditure and the dependent variables move simultaneously and affect each other over time.

Empirical specification. The model is built step-by-step to show how the different parts of the model change the results. The first specification shows a correlation coefficient when we do not include controls. In specification 2, we include the economic, demographic and institutional control variables. We add year fixed effects to control for the business cycle and other time effects in specification 3. We include country fixed effects to control for unobserved characteristics (e.g. institutional differences between countries) in specification 4. Then, in specification 5, we run a 2SLS regression model, in which we use the social expenditure variables in period (t-2) as instruments. The regression equation of our 2SLS model is as follows:

$$yit = \alpha_t \quad + \quad \beta_i + X_{it}^{'} v_{\chi} + \gamma SE_{it-1} + \epsilon_{it} \qquad (1)$$

$$SE_{it-1} = \alpha_t + \beta_i + \delta SE_{it-2} + X_{it}^{'} v_{\chi} + \mu_{it} \qquad (2)$$

The dependent variables in which we are interested are denoted by y_{it}, standing for poverty, inequality and GDP growth, which vary by country ($i = 1,...,N$) and years ($t = 1,...,T$). We regress the outcome variables on year fixed effects (α_t) country fixed effects (β_i), economic and demographic controls ($_{it}^{X'}$) with coefficients v_x and the explanatory variables of interest for social expenditure (SE_{it-1}) with coefficient γ. The second lags of the social expenditure variables, our instruments in the first stage, are captured by SE_{it-2} with coefficient δ. Finally,

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specification 5 gives our most preferred model, given by regression equations 3 and 4:

$$y_{it} = \alpha_t + \beta_i + X_{it}^{'} v_\chi + \gamma SE_{it-1} + \mu_{it} \tag{3}$$

$$\mu_{it} = \rho\mu_{it-1} + \epsilon_{it} \tag{4}$$

We prefer this OLS model over the 2SLS model as we cannot prove that the exclusion restriction holds, making OLS estimates with panel corrected standard errors in which we control for first order autocorrelation most reliable. This model is the same as the second stage of the 2SLS model, but now we control for autocorrelation in the error term. We use robust standard errors in the first four empirical specifications and panel corrected standard errors in specification 5.

Results

Main results. Table 3 presents the results for the relationship between total public social expenditure and poverty. The first column shows the correlation coefficient in the model when we only control for economic, demographic and institutional control variables. We find a negative significant coefficient of −0.237. Adding year fixed effects in column 2 increases the negative coefficient to −0.409. The coefficient decreases slightly when we include country fixed effects in column 3, but increases again to 0.431 in our 2SLS model in column 4. In our preferred specification, column 5, we run an OLS model with panel corrected standard errors in which we control for serial correlation. The coefficient of total public social expenditure on poverty has a statistically significant coefficient of −0.337. This coefficient indicates that a 1 percentage point increase in total social expenditure is associated with a 0.337 percentage point lower poverty level one year later. In turn, increases in GDP per capita, the population share aged 15–64, the population share aged 65+ and trade union density rate are associated with lower poverty rates. However, these coefficients are smaller than the coefficient for total public social expenditure.

Table 4 shows the relation between total public social expenditure (t-1) and poverty, Gini and GDP growth in our preferred model. Tables A.3 and A.4 in the online Appendix show the six different regression models for inequality and growth. In Table 4, we find a negative significant coefficient of total public social expenditure on inequality of −0.0038, which is 9 per cent of the standard deviation of Gini. This coefficient seems small, but it is a function of the units in which variables are measured and is large compared to the coefficients of GDP per capita (−0.0018), unemployment rate (−0.0008) and trade union density (−0.0006), which are the controls that are significantly related to the Gini (see

Table 3. *Estimation results of total public social expenditure on poverty*

	(1) Poverty	(2) Poverty	(3) Poverty	(4) Poverty	(5) Poverty
Total public social expenditure (t-1)	-0.237*** (0.053)	-0.409*** (0.080)	-0.372*** (0.107)	-0.431*** (0.077)	-0.337*** (0.074)
GDP per capita (t-1)	0.020 (0.038)	0.027 (0.027)	-0.162 (0.117)	-0.180** (0.086)	-0.147** (0.059)
Unemployment rate (t-1)	0.085 (0.059)	0.303*** (0.083)	0.032 (0.072)	0.030 (0.049)	0.037 (0.040)
Population 15-64 (t-1)	-0.130 (0.246)	-0.369 (0.246)	-0.275 (0.272)	-0.371** (0.172)	-0.286* (0.170)
Population 65+ (t-1)	0.246 (0.171)	0.583** (0.249)	-0.209 (0.160)	-0.269** (0.126)	-0.223* (0.133)
Trade union density (t-1)	-0.058*** (0.020)	-0.032** (0.014)	-0.102*** (0.038)	-0.092*** (0.023)	-0.097*** (0.016)
Control variables	Yes	Yes	Yes	Yes	Yes
Year dummies	No	Yes	Yes	Yes	Yes
Country fixed effects	No	No	Yes	Yes	Yes
Ar1 component	No	No	No	No	Yes
Method	OLS	OLS	OLS	2SLS	OLS
Standard errors	Robust	Robust	Robust	Robust	PCSE
Observations	275	275	275	270	275
R-squared	0.468	0.628	0.926	0.327	0.923
Number of countries	22	22	22	21	22

Notes: * denotes significant at the 10% level, **at the 5% level and ***at the 1% level. Panel corrected standard errors in parentheses.
Source: Own calculations based on EU Survey on Income and Living conditions for European countries (EU-SILC).

the online Appendix, Table A.3). In column 3, we find a positive but statistically insignificant coefficient for total public social expenditure on GDP growth. Finding a statistically insignificant coefficient may explain why the effect of social protection on GDP growth is disputed in the academic literature.

The online Appendix, Table A.4, presents the other models for growth and we find a negative significant relation in specifications 1 to 3, but the coefficient becomes positive and statistically insignificant when we include country fixed effects. This suggests that countries with lower social spending have grown faster, but that no effect remains when we merely consider the within countries variation over time by controlling for (unobserved) differences between countries. Adding fixed effects is needed to make sure that there are no other differences between countries that explain both social expenditure and GDP growth, for example different phases of development.

Table 4. *Estimation results of total public social expenditure on poverty, inequality and GDP growth*

	(1) Poverty	(2) Gini	(3) GDP growth
Total public social expenditure (t-1)	-0.337*** (0.074)	-0.0038*** (0.0005)	0.142 (0.102)
GDP per capita (t-1)	-0.147** (0.059)	-0.0018*** (0.0004)	
Unemployment rate (t-1)	0.037 (0.040)	0.0008*** (0.0002)	
Trade union density (t-1)	-0.097*** (0.016)	-0.0006** (0.0002)	
Population 15-64 (t-1)	-0.286* (0.170)	-0.0019 (0.0019)	-0.118 (0.261)
Population 65+ (t-1)	-0.223* (0.133)	-0.0012 (0.0013)	-0.222 (0.293)
Capital formation growth (t-1)			-0.001 (0.013)
Education (t-1)			-0.006 (0.056)
Export (t-1)			0.056** (0.028)
Inflation (t-1)			-0.096* (0.057)
Year dummies	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes
Ar1 component	Yes	Yes	Yes
Method	OLS	OLS	OLS
Standard errors	PCSE	PCSE	PCSE
Observations	275	275	406
R-squared	0.923	0.9634	0.610
Number of countries	22	22	22

Notes: *denotes significant at the 10% level, **at the 5% level and ***at the 1% level. Panel corrected standard errors in Parentheses.
Source: Own calculations based on EU Survey on Income and Living conditions for European countries (EU-SILC).

Table 5 uses the same preferred models to examine the relationships between the different social expenditure types and poverty, inequality and GDP growth. Column 1 gives the relation between the different social expenditure schemes and poverty. Social expenditure on "family, unemployment and ALMPs" and "housing and others" are negatively and significantly related to poverty. The largest coefficients are found for "family" (−1.156) and "housing and others" (−0.794). This indicates that a 1 percentage point increase in social spending on families as a percentage of GDP is associated with a 1.156 percentage point lower poverty rate in the next year. Column 2 shows the connection between the different kinds of social expenditure and the Gini coefficient for income inequality. We find that spending on "old age and survivors" (−0.0058) and

Table 5. *Estimation results of different kinds of social expenditure on poverty, inequality and GDP growth*

	(1) Poverty	(2) Gini	(3) GDP growth
Old age and survivors SE (t-1)	-0.197 (0.152)	-0.0058*** (0.0009)	0.275 (0.254)
Incapacity SE (t-1)	-0.061 (0.324)	-0.0009 (0.0027)	0.023 (0.279)
Health SE (t-1)	-0.021 (0.154)	-0.0015 (0.0009)	-0.033 (0.222)
Family SE (t-1)	-1.156*** (0.215)	-0.0108*** (0.0035)	0.576 (0.466)
Unemployment and ALMPs SE (t-1)	-0.429*** (0.141)	-0.0021 (0.0018)	-0.332 (0.291)
Housing and others SE (t-1)	-0.794** (0.367)	0.0037 (0.0028)	1.211* (0.644)
GDP per capita (t-1)	-0.146** (0.063)	-0.0021*** (0.0005)	
Unemployment rate (t-1)	0.029 (0.037)	0.0010*** (0.0002)	
Trade union density (t-1)	-0.078*** (0.016)	-0.0007** (0.0003)	
Population 15-64 (t-1)	-0.183 (0.186)	-0.0004 (0.0018)	-0.187 (0.264)
Population 65+ (t-1)	-0.114 (0.165)	-0.0003 (0.0012)	-0.341 (0.322)
Capital formation growth (t-1)			-0.001 (0.013)
Education (t-1)			-0.014 (0.058)
Export (t-1)			0.061** (0.029)
Inflation (t-1)			-0.106* (0.059)
Year dummies	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes
Ar1 component	Yes	Yes	Yes
Method	OLS	OLS	OLS
Standard errors	PCSE	PCSE	PCSE
Observations	275	275	400
R-squared	0.927	0.9676	0.619
Number of countries	22	22	22

Notes: *denotes significant at the 10% level, **at the 5% level and ***at the 1% level. Panel corrected standard errors in Parentheses.
Source: Own calculations based on EU Survey on Income and Living conditions for European countries (EU-SILC).

"family" (-0.0108) are negatively and significantly related to the Gini coefficient. In column 3, we find that only expenditure on "housing and others" (1.211) is significantly related to GDP growth. An increase of 1 percentage point in public social expenditure on "housing and others" is associated with a 1.211 percentage point increase in GDP growth over the next three years. However, countries

spend on average only 0.7 per cent of GDP on "housing and others", indicating that this spending category plays only a small role as a determinant of GDP growth.

The results in Table 5 suggest large differences in effects between the different social expenditure schemes, providing policy-makers with the possibility to target more accurately when selecting social expenditure schemes for the policy goals of reducing poverty and inequality without detrimental effects on GDP growth.

The two largest categories of social expenditure, "old age and survivors" and "health", are particularly interesting. "Old age and survivors" expenditure is negatively and significantly related to inequality, but there is no statistically significant relation to poverty or to GDP growth. Finding a strong negative relation with the Gini, but no statistically significant relation with poverty, indicates that the groups in the middle of the income distribution benefit most from spending on "old age and survivors". The large positive coefficient for "old age and survivors" on GDP growth indicates that there is, at least, no large negative association between spending on "old age and survivors" and GDP growth. For "health" expenditure, we find no significant relationship with any of the outcome variables.

In the online Appendix, Table A.5, we run separate regression models for the different social expenditure variables including only one social expenditure variable in our model at a time. We do this because inclusion of all could lead to multicollinearity issues. This additional analysis shows that the only difference is that the negative coefficients of social expenditure on "incapacity" and "unemployment and ALMPs" on the Gini become statistically significant.

Sensitivity analysis. Finally, we ran a large number of additional robustness checks. The results are almost the same for the effects of "total public and private mandatory social expenditure" (online Appendix, Table A.6) and "total social expenditure" (including voluntary private social expenditure) (online Appendix, Table A.7). For net social expenditure, we find results that are similar to our results for gross total social expenditure (online Appendix, Table A.8 and Table A.9).

In the online Appendix, Table A.10, we consider the effects for a sample of OECD countries.[9] The coefficient size of total public social expenditure on

9. Countries in OECD sample: Australia, Austria, Belgium, Canada, Chile, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Republic of Korea, Latvia, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. Excluding Israel, Mexico and Australia in our poverty and inequality models and excluding New Zealand and Turkey in our GDP growth models, for reasons of data availability.

poverty slightly decreases to −0.239 and the coefficient size of total public social expenditure on the Gini decreases substantially to −0.0017; both coefficients remain highly significant. For GDP growth, our positive coefficient of total social expenditure becomes statistically significant: a 1 percentage point increase in public social expenditure is associated with a 0.134 percentage point increase in GDP growth in the next three years.

For the different expenditure categories, presented in the online Appendix Table A.11, we find very similar results for the OECD sample compared to the EU sample. The only two differences are that, for the OECD sample, the negative coefficient of "unemployment and ALMPs" on the Gini becomes statistically significant and the positive coefficient of expenditure on "housing and others" on GDP growth turns statistically insignificant. Table A.12 in the online Appendix shows similar results when we include only one social expenditure category in the model at a time. The negative coefficients of "incapacity" expenditure on poverty as well as on the Gini turn significant now. When we separate "housing and others", in Table A.12, we still find a positive significant coefficient for "others" (mostly social assistance) on GDP growth.

In Tables A.13–A.16 in the online Appendix, we show the importance of progressivity for the different expenditure types. Our base results already present the progressivity of the various expenditure types, because we are studying the effect of a 1 percentage point of GDP increase in spending for different expenditure types on poverty and inequality.[10] Tables A.13–A.17 in the online Appendix supplement our analysis by using a progressivity index, which we have calculated based on the dataset from Caminada et al. (2017), which is based on Luxembourg Income Study (LIS) data. This progressivity indicator is calculated by taking the difference between the Gini before and after redistribution and by dividing this difference by spending on this expenditure type as a percentage of GDP. Table A.13 confirms that expenditure on "housing and others" is best targeted at the poor, which is in line with Table 1. Tables A.14–A.17 in the online Appendix present the results for the interaction effects between social expenditure as per cent of GDP and the progressivity of spending. The interaction effects on poverty and inequality are almost always negative, suggesting that the progressivity is indeed important to reduce poverty and inequality. However, these interaction effects are not statistically significant, most likely because the number of observations available for this progressivity index is small. Therefore, we should not draw strong conclusions based on Tables A.13–A.16.

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10. For example, expenditure on "housing and others" has a higher level of progressivity than expenditure on "health" if a 1 percentage point increase in expenditure on "housing and others" reduces poverty much more than a 1 percentage point of GDP increase in expenditure on "health".

In Table A.17, we show the results for the years 2008–2015. We find a smaller negative coefficient for total social expenditure on poverty and inequality and a larger positive coefficient, but statistically insignificant, for total social expenditure on GDP growth. Table A.18 in the online Appendix shows the results for the years 1990–2007 and confirms that our results are not driven by the Great Recession, as the differences between the results in Tables A.17 and A.18 are not statistically significant for poverty and GDP growth. Although not statistically significant, the coefficient size of total public social expenditure on GDP growth is more than twice as large for the years 2008–2015 as for the years 1990–2007. Hence, if the business cycle has any impact on the effect of total public expenditure on GDP growth it would probably be positive.

We also study whether our results are robust for the working-age population. In Table A.19 in the online Appendix, we find that the coefficient of total public social expenditure on the working poor is small and insignificant. However, we do find a negative association between total public social expenditure and the poverty rate and Gini coefficient for the age group 18–65. We find that spending on "family", "unemployment and ALMPs", and "housing and others" also have the strongest negative relation with poverty for the working-age population. Spending on "old age and survivors" and "family" are again negatively related to inequality when we consider the working-age population.

Referring again to the online Appendix, Table A.20 gives the results for a poverty rate of 60 per cent rather than of 50 per cent. Most interesting is the negative relation between "old age and survivors", which becomes stronger and statistically significant, with a coefficient of −0.504. When we compare the differences in results between the 50 per cent and 60 per cent poverty rates, we can infer the following: "housing and others" are most effective in reducing poverty among the poorest decile of the income distribution, whereas "old age and survivors" expenditure reduces poverty among the second decile.

Tables A.21–A.23 in the online Appendix show that our results are robust when we consider different time lags for our explanatory variables. Finally, the online Appendix shows that the results remain robust if we exclude Greece from our sample (Table A.24), if we use only one demographic control variable (Table A.25) and if we estimate our model without control variables (Table A.26).

Conclusion

In this article, we have studied how different social expenditure schemes are related to poverty, inequality and economic growth. First, we find that total public social expenditure is negatively related to poverty and inequality, but not related to GDP growth. Hence, the results do not support a trade-off between reducing

poverty and inequality through total public social expenditure on the one hand and GDP growth on the other hand. This result adds to a growing number of studies that reject the existence of a trade-off between equity and inefficiency at a macro level (Bellettini and Ceroni, 2000; Thewissen, 2013; Berg et al., 2018).

Second, we find substantial differences between the effects of various types of social expenditure. These differences allow policy-makers to achieve better targeting and thereby increase the effectiveness of reducing poverty and inequality, without detrimental effects on GDP growth. Studying which expenditure categories are most effective answers the call of Ostry, Berg and Tsangarides (2014) for more research on the mechanisms at play to make redistribution as efficient as possible. Although the relationships presented in this article can help policy-makers to set priorities, some caution is justified. One issue is that the underlying models are not sufficient to make strong causal claims. A second is that there are wider policy goals that must be considered other than merely poverty, inequality and growth.

Our results suggest that the strongest negative relation with both poverty and inequality is found for social expenditure on "families". Social expenditure on "unemployment and ALMPs" and "housing and others" (mostly social assistance) are also effective ways of reducing poverty, but not for reducing the Gini for income inequality. Social expenditure on "old age and survivors" is negatively related to the Gini for income inequality, but the negative relation with poverty is not statistically significant. Hence, social expenditure on "family", "unemployment and ALMPs", and "housing and others" are on average better targeted at the poor, while social expenditure on "old age and survivors" has a more universal character to the benefit of a larger group of people. However, the budgets of the expenditure schemes that are best targeted at the poor are relatively small. Therefore, spending on "old age and survivors" may still be important for reducing poverty in absolute terms, because much larger amounts are spent on this category.

For GDP growth, finding a strong positive relationship with social expenditure on "housing and others" indicates that the social expenditure type best targeted at the poor is positively associated with GDP growth. This is in line with Cingano (2014) and OECD (2014) who show that the negative impact of inequality on growth mainly can be explained by the gap between the bottom and the middle of the income distribution. Possible explanations for the positive association between spending on "housing and others" and GDP growth are the positive effects of the safety net on the potential of the poor, the development of skills, levels of risk-taking and the stabilizing effect on aggregate demand. Potential negative effects on labour supply may be compensated by higher levels of productivity when a greater share of the potential of poor people is released. Furthermore, expenditure on housing may have a large fiscal multiplier as there are

non-negligible spillover effects from the housing market to the broader economy (Iacoviello and Neri, 2010), causing a relatively large positive effect on GDP growth.

Overall, we can conclude that there is no negative statistically significant relationship between any of the social expenditure types and GDP growth and that the expenditure type most effective in reducing poverty is positively related to economic growth. This suggests that, when social expenditure is used to reduce poverty and inequality, there is no trade-off with economic growth. Further, the expenditure types with the strongest negative relation with poverty are not the same as the ones that are most strongly negatively related with inequality. In line with Korpi and Palme (1998), our study shows that income inequality is most strongly negatively related to expenditure types that are directed to a broader group rather than just to the poor, which are the social expenditures on "old age and survivors" and "family".

Bibliography

Aber, J. L. et al. 1997. "The effects of poverty on child health and development", in *Annual Review of Public Health*, Vol. 18, No. 1.

Adema, W.; Fron, P.; Ladaique, M. 2014. "How much do OECD countries spend on social protection and how redistributive are their tax/benefit systems?", in *International Social Security Review*, Vol. 67, No. 1.

Alesina, A.; Rodrik, D. 1994. "Distributive politics and economic growth", in *Quarterly Journal of Economics*, Vol. 109, No. 2.

Arjona, R.; Ladaique, M.; Pearson, M. 2003. "Growth, inequality and social protection", in *Canadian Public Policy/Analyse de Politiques*, Vol. 29, Suppl.

Atkinson, A. B. 1995. "Is the welfare state necessarily an obstacle to economic growth?", in *European Economic Review*, Vol. 39. No. 3.

Bakija, J. et al. 2016. *How big should our government be?*. Berkeley, CA, University of California Press.

Baldacci, E. et al. 2008. "Social spending, human capital, and growth in developing countries", in *World Development*, Vol. 36, No. 8.

Banerjee, A. V.; Benabou, R.; Mookherjee, D. 2006. *Understanding poverty*. Oxford, Oxford University Press.

Barro, R. J. 1996. *Determinants of economic growth: A cross-country empirical study* (NBER working paper, No. 5698). Cambridge, MA, National Bureau of Economics Research.

Barro, R. J. 2013. "Education and economic growth", in *Annals of Economics and Finance*, Vol. 14, No. 2.

Bellettini, G.; Ceroni, C. B. 2000. "Social security expenditure and economic growth: An empirical assessment", in *Research in Economics*, Vol. 54, No. 3.

Benabou, R. 2000. "Unequal societies: Income distribution and the social contract", in *American Economic Review*, Vol. 90, No. 1.

Berg, A. et al. 2018. "Redistribution, inequality, and growth: new evidence", in *Journal of Economic Growth*, Vol. 23, No. 3.

Blanchard, O. J.; Leigh, D. 2013. "Growth forecast errors and fiscal multipliers", in *American Economic Review*, Vol. 103, No. 3.

Brooks-Gunn, J.; Duncan, G. J. 1997. "The effects of poverty on children", in *The Future of Children*, Vol. 7, No. 2.

Caminada, K. et al. 2017. *Income inequality and fiscal redistribution in 47 LIS-countries (1967-2014)* (LIS working paper, No. 724). Luxembourg, Luxembourg Income Study.

Caminada, K. et al. 2019. "Has the redistributive effect of social transfers and taxes changed over time across countries?", in *International Social Security Review*, Vol. 72, No. 1.

Caminada, K.; Goudswaard, K. 2009. "Effectiveness of poverty reduction in the EU: A descriptive analysis", in *Poverty & Public Policy*, Vol. 1, No. 2.

Card, D. 2001. "The effect of unions on wage inequality in the U.S. labor market", in *ILR Review*, Vol. 54, No. 2.

Cingano, F. 2014. *Trends in income inequality and its impact on economic growth* (OECD Social, employment and migration working paper, No. 163). Paris, Organisation for Economic Co-operation and Development.

Connor, P. et al. 2019. "Income inequality and white-on-black racial bias in the United States: Evidence from Project Implicit and Google Trends", in *Psychological Science*, Vol. 30, No. 2.

Dabla-Norris, E. et al. 2015. *Causes and consequences of income inequality: A global perspective*. Washington, DC, International Monetary Fund.

Darby, J.; Melitz, J. 2008. "Social spending and automatic stabilizers in the OECD", in *Economic Policy*, Vol. 23, No. 56.

De Deken, J. 2014. "Identifying the skeleton of the social investment state: Defining and measuring patterns of social policy change on the basis of expenditure data", in B. Cantillon and F. Vandenbroucke (eds), *Reconciling work and poverty reduction: How successful are European welfare states?*. Oxford, Oxford University Press.

Easterly, W. 2007. "Inequality does cause underdevelopment: Insights from a new instrument", in *Journal of Development Economics*, Vol. 84, No. 2.

Feldstein, M. 1974. "Social security, induced retirement, and aggregate capital accumulation", in *Journal of Political Economy*, Vol. 82, No. 5.

French, E.; Song, J. 2014. "The effect of disability insurance receipt on labor supply", in *American Economic Journal: Economic Policy*, Vol. 6, No. 2.

Goudswaard, K.; Caminada, K. 2010. "The redistributive effect of public and private social programmes: A cross-country empirical analysis", in *International Social Security Review*, Vol. 63, No. 1.

Hooghe, M.; Oser, J. 2016. "Trade union density and social expenditure: A longitudinal analysis of policy feedback effects in OECD countries, 1980–2010", in *Journal of European Public Policy*, Vol. 23, No. 10.

Iacoviello, M.; Neri, S. 2010. "Housing market spillovers: Evidence from an estimated DSGE model", in *American Economic Journal: Macroeconomics*, Vol. 2, No. 2.

ILO. 2014. *World social protection report 2014/15: Building economic recovery, inclusive development and social justice.* Geneva, International Labour Office.

Jacques, O.; Noel, A. 2018. "The case for welfare state universalism, or the lasting relevance of the paradox of redistribution", in *Journal of European Social Policy*, Vol. 28, No. 1.

Kenworthy, L. 1999. "Do social-welfare policies reduce poverty? A cross-national assessment", in *Social Forces*, Vol. 77, No. 3.

Keynes, J. M. 1937. "The general theory of employment", in *Quarterly Journal of Economics*, Vol. 51, No. 2.

Korpi, W.; Palme, J. 1998. "The paradox of redistribution and strategies of equality: Welfare state institutions, inequality, and poverty in the Western countries", in *American Sociological Review*, Vol. 63, No. 5.

Krueger, A. B.; Meyer, B. D. 2002. "Labor supply effects of social insurance", in *Handbook of public economics*, Vol. 4.

Krueger, A. B.; Pischke, J.-S. 1992. "The effect of social security on labor supply: A cohort analysis of the notch generation", in *Journal of Labor Economics*, Vol. 10, No. 4.

Lupu, N.; Pontusson, J. 2011. "The structure of inequality and the politics of redistribution", in *American Political Science Review*, Vol. 105, No. 2.

Mani, A. et al. 2013. "Poverty impedes cognitive function", in *Science*, Vol. 341, No. 6149.

Milanovic, B. 2000. "The median-voter hypothesis, income inequality, and income redistribution: An empirical test with the required data", in *European Journal of Political Economy*, Vol. 16, No. 3.

Muis, J.; Immerzeel, T. 2017. "Causes and consequences of the rise of populist radical right parties and movements in Europe", in *Current Sociology*, Vol. 65, No. 6.

OECD. 2007. *The social expenditure database: An interpretive guide SOCX 1980–2003.* Paris, Organisation for Economic Co-operation and Development.

OECD. 2014. *Focus on inequality and growth.* Paris, Organisation for Economic Co-operation and Development.

OECD. 2015. *In it together: Why less inequality benefits all.* Paris, Organisation for Economic Co-operation and Development.

Okun, A. M. 1975. *Equality and efficiency: The big tradeoff.* Washington, DC, Brookings Institution.

Ostry, M. J. D.; Berg, M. A.; Tsangarides, M. C. G. 2014. *Redistribution, inequality, and growth.* Washington, DC, International Monetary Fund.

Perotti, R. 1996. "Growth, income distribution, and democracy: What the data say", in *Journal of Economic Growth*, Vol. 1, No. 2.

Persson, T.; Tabellini, G. 1994. "Is inequality harmful for growth?", in *American Economic Review*, Vol. 84, No. 3.

Piketty, T. 2014. *Capital in the twenty-first century*. Cambridge, MA, Belknap Press of Harvard University Press.

Rust, J.; Phelan, C. 1997. "How social security and medicare affect retirement behavior in a world of incomplete markets", in *Econometrica*, Vol. 65, No. 4.

Singh, A. 1996. "Pension reform, the stock market, capital formation and economic growth: A critical commentary on the World Bank's proposals", in *International Social Security Review*, Vol. 49, No. 3.

Solow, R. M. 1956. "A contribution to the theory of economic growth", in *Quarterly Journal of Economics*, Vol. 70, No. 1.

Thewissen, S. 2013. "Is it the income distribution or redistribution that affects growth?", in *Socio-Economic Review*, Vol. 12, No. 3.

Van Vliet, O.; Wang, C. 2015. "Social investment and poverty reduction: A comparative analysis across fifteen European countries", in *Journal of Social Policy*, Vol. 44, No. 3.

Wang, C.; Caminada, K.; Goudswaard, K. 2012. "The redistributive effect of social transfer programmes and taxes: A decomposition across countries", in *International Social Security Review*, Vol. 65, No. 3.

Wang, C.; Caminada, K.; Goudswaard, K. 2014. "Income redistribution in 20 countries over time", in *International Journal of Social Welfare,* Vol. 23, No. 3.

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Supporting information

Additional supporting information may be found online in the Supporting Information section at the end of this article.