Economic Effects of Social Protection

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5 The Relationship between Different Social Expenditure Schemes and Poverty, Inequality and Economic Growth

Abstract

In this paper, we study how different social expenditure types are related to poverty, income inequality and GDP growth. We contribute to the literature on the potential trade-off between redistribution and economic growth as well as to the literature on the targeted versus universal approach to the welfare state. For this purposes, we use a panel data set for 22 EU-countries from 1990 till 2015. We employ OLS and 2SLS regression models in which we deal with endogeneity problems extensively. 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 on 1) old age and survivor, 2) incapacity, 3) health, 4) family, 5) unemployment and active labour market policies and 6) housing and others.

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5.1 Introduction

Since Piketty (2014), strengthened by the rise of populist movements, there is a resurgence of the public and academic debate on income and wealth inequality. For a long time, policy makers and academics assumed a trade-off between reducing income inequality and increasing GDP growth (Okun 1975; Benabou 2000; Arjona et al. 2003). More recent 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). However, this negative association between inequality and growth does not yet imply that higher levels of redistribution are related to higher economic growth. At least, the latest empirical evidence does not support that redistribution is negatively related to economic growth (Thewissen 2013; Ostry et al. 2014). Nevertheless, redistribution is a broad concept and different kinds of redistribution, translated into different social expenditure types, have different effects on poverty, inequality and economic growth.

In this paper, we study how different social expenditure types are related to poverty, inequality and GDP growth. First, we investigate how social expenditure at the aggregated level is related to poverty, inequality and GDP growth. This analysis gives insights into the potential trade-off between poverty and inequality on the one hand and GDP growth on the other hand. Second, we study how these relationships between social expenditure and poverty, inequality and GDP growth differ for social expenditure on *1) old age and survivor, 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 first contribution to the literature is studying whether the expenditure types that reduce poverty and inequality the most are also related to economic growth. This gives new evidence for the presence or absence of a trade-off between redistribution and growth. As a result, we identify the expenditure types which are most effective in reducing poverty and inequality while also being positively related to economic growth. Our second contribution is to study how targeted as well as universal expen-

diture types affect poverty, inequality and growth. This contributes to the literature on the targeted versus the universal approach to the welfare state (Korpi and Palme 1998; Jacques and Noël 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 itself is also depending on growth and potentially also on poverty and inequality. In our 2SLS model, we use the social expenditure variables in period (t-2) as 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 EU-countries for the years 1990-2015 for our base results and a panel data set of 32 OECD countries in our robustness analysis. The data are taken 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 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 *family, unemployment and ALMPs* and *housing and other*.[1] For inequality, we find a strong negative connection with social expenditure on *old age and survivor* and *family*. Finally, a strong positive relation with GDP growth is found for expenditure on *housing and others*.

The outline of the paper is as follows. We start with describing the literature on the effects (and mechanisms) of social expenditure on poverty, inequality and GDP growth in Section 5.2. The data is described in Section 5.3, the methodology in Section 5.4 and the results in Section 5.5. We conclude with a discussion of the results in Section 5.6.

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

5.2 Literature

5.2.1 The effects of social expenditure on poverty and inequality

We expect social expenditure to reduce poverty and inequality (Caminada and Goudswaard 2009; Adema et al. 2014; ILO 2014). Wang et al. (2012) and Caminada et al. (2019) find that public pensions account for the largest reduction in income inequality but also social assistance, disability benefits, family benefits and unemployment benefits have a negative effect on income inequality. Wang et al. (2014) observe that the tax-benefit systems have offset two-thirds of the average increase in primary income inequality, old age benefits accounted for 60% and social assistance for 20% of the increase in redistribution.

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 of all, because universal social expenditure types can count on more public support as a larger share of the population is benefiting, translating in 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, because the Gini coefficient is much more sensitive to the income groups in the middle of the income distribution than to the bottom or the top of the income distribution.

In table 5.1 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. This table gives an indication which social expenditure categories are best targeted at the poor. We find that housing and social exclusion benefits are best targeted at the poor with 52% and 62% of cash benefits being received by the bottom 20% of the income distribution. Afterwards family benefits are best targeted with 48% going to the bottom 40%. Disability benefits and unemployment benefits are about equally distributed over

the five income quintiles. Social expenditure on old age is not targeted at the poor at all, only 28% of old age cash benefits are received by the bottom 40% of the income distribution.

Table 5.1: Share of social benefits received by quintiles of 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: Source: Own calculations based on EU Survey on Income and Living Conditions for European countries (EU-SILC). The calculations are based on equialized household income in 2015 for 21 of the 22 EU-countries in our sample, excluding Germany which is not available in EU SILC.

Another expenditure type which we expect to be effective in reducing poverty and inequality is family expenditure. First of all, because families are more often poor because income must be shared with more household members, including children and non-working adult members. In line with this, higher poverty rates are observed among children than among adults. Second, due to economies of scale for larger households, it is relatively cheap to reduce the poverty rate by targeting on families. Also for the Gini, we expect a large negative effect of family spending, because a large share of family spending is received by the second and third quintiles of the income distribution (25% and 21% of family spending). 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.

The effects of social expenditure on economic growth 5.2.2

The literature is divided on the effect of social spending on 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; Ostry et al. 2014; Bakija et al. 2016). 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 highly depends on the social insurance system in place. In a pay-as-you-go pension system, the expected effect of old age expenditure on savings is negative as fewer 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 can be higher than the amount people would have saved otherwise. Hence, a capital-based pension system can increase total savings and investments and thereby economic growth.

Another main determinant of growth is labor supply. The welfare state typically decreases labor supply as the benefit of supplying labor decreases when the outside option becomes more attractive (Krueger and Meyer 2002; French and Song 2014). There are also some studies which find no effect, or even a positive effect, of social protection schemes on labor supply (Krueger and Pischke 1992; Rust and Phelan 1997). All these studies show that the effects of welfare state programs (e.g. retirement schemes) on labor supply can be explained for a large part by the specific features of the social security system. The largest negative effects on labor supply are expected for the expenditure type *unemployment and ALMPs*, as these target the working age population and not children, the old or the disabled. Besides, only unemployed people are eligible for unemployment benefits, which may create a disincentive to work.

In addition to labor supply, the level of productivity is also important. Social expenditure affects the level of productivity by two main mechanisms: it increases risk-taking behavior and it reduces poverty. First, social protection decreases income risks and this may increase risk-taking, investments, productivity and thereby growth.We expect an increase in risk taking, not only for the poor, but also for the middle class who know they can rely on the social safety net when needed. For example, social security

increases investments by employees in their firm and industry-specific skills (Estevez-Abe et al. 2001). As social protection provides security, the willingness to build up dependence on particular employers and hence being more vulnerable to market fluctuations increases. Second, poverty has a negative effect on productivity. Children's health, capabilities and achievements are negatively affected by poverty (Aber et al. 1997; Brooks-Gunn and Duncan 1997). Furthermore, poverty reduces the cognitive capacity of the brain (Banerjee et al. 2006; Mani et al. 2013). Hence, reducing poverty may increase the capacities of poor people which may translate into increases in productivity and GDP growth. Not only poverty, but also inequality can be detrimental to economic growth. Increased income inequality depresses the development of skills among individuals 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.

Finally, social expenditure is expected to have a positive effect on aggregate demand, as the lower and middle-income groups consume a larger part of their income (Keynes 1937). For this reason, we expect the largest positive effects on aggregate demend, for the best targeted schemes. The positive effect of an increase in aggregate demand on economic growth is expected to be larger when aggregate demand is low. Blanchard and Leigh (2013) find large fiscal multiplier during the Great Recession. Darby and Melitz (2008) show in an empirical analysis for 21 OECD countries that spending on unemployment, old age and health-related social expenditure, as well as incapacity and sickness benefits, react to the cycle in a stabilizing manner.

All in all, for GDP growth, we expect the largest positive effects of the targeted schemes when the most important mechanisms are: an increase in risk-taking, releasing the potential of the poor and increasing aggregate demand. Furthermore, we expect the potential negative effects caused by lower capital accumulation to be limited for poor people, because of their low levels of physical capital. Potential negative effects of targeted schemes on labor supply may be compensated by higher levels of productivity when more of the potential of poor people is released. Hence, we expect the largest positive effects on GDP growth of spending on *housing*

and others, as these are best targeted at the poor, see Table 5.1. If labor supply is important for economic growth, spending on *unemployment and ALMPs* is expected to reduce GDP growth, as unemployment benefits may disincentivize work. When we consider the size of the different social expenditure types, we expect large effects of spending on *old age and survivor* as this spending category is most sizable. However, the direction of the effect of old age spending on GDP growth is harder to predict, because a lot depends on the institutional settings of countries.

5.3 Data

We use a panel data set for 22 EU-countries that are a member of the OECD covering 26 years from 1990-2015. The countries in our EU sample are: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and the United Kingdom. The data set is limited to EU countries that are a member of the OECD for reasons of data availability, but also because these countries are more similar in their characteristics, making the results more reliable. We employ the same analysis for a sample of 32 OECD countries in our robustness analysis. Selecting the period 1990-2015 allows us to take the post-Soviet states into account and provides us with a more balanced sample as much less data is available for the years before 1990.

Our dependent variables are the poverty rate (poverty after taxes and transfers for a poverty line of 50%), the Gini coefficient for income inequality (Gini for disposable income post taxes and transfers) and average GDP growth rate over 3 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 of the OECD and the GDP growth rates are taken from the Annual National Accounts data of the OECD.

The explanatory variables of interest are social expenditure variables for which we use the Social Expenditure Database (SOCX) of the OECD. 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 available on net social expenditure and no data is available on net social expenditure for the different expenditure categories. But we perform the same analysis with the limited available data for net social expenditure in our robustness analysis. All in all, social expenditure variables are the most objective and most used variables for studying the effects of the welfare state.

Another point is if 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) are looking at expenditure schemes targeted at the working-age population on poverty and inequality among the working-age. The main question is if pensions are about redistribution over the life cycle or about redistribution between individuals. Also cohort effects may blur the effects of social expenditure. We choose to look at different social expenditure types, among which 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 % 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. 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 that public and private social expenditure are close substitutes (Goudswaard and Caminada 2010). Our total public social expenditure variable is separated in spending on 1) old age and survivor, 2) incapacity, 3) health, 4) family, 5) unemployment and active labour market policies and 6) housing and others, which are our next explanatory variables. See Table A.5.1 for a more detailed description of these different categories of social expenditure.

Table 5.2 shows the descriptive statistics for poverty, inequality, and GDP growth and the various social expenditure variables for our sample of EU countries during the period 1990-2015. On average 9.2 percent of the population has an income below the poverty line of 50% 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 percent between 1990 and 2015. Table 5.2 also denotes the mean values and standard deviations for the different social expenditure variables. Total public social expenditure is on average 22.1% of GDP, the largest part is going to *old age and survivor* (9.1% of GDP) and *health spending* (5.7% of GDP). Lower amounts are spent on *incapacity* (2.6% of GDP), *families* (2.2% of GDP), *unemployment and ALMPs* (1.8%) and *housing and others* (0.7%).

Table 5.2: Descriptive statistis: 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 Survivor 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
Unemp. 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

The control variables we use in our models for poverty and inequality are GDP per capita (measured in thousands of USD, constant prices,

2010 PPPs), unemployment rate (harmonized), population share 15-64 years of age, population share 65 plus and the trade union density, the data are taken from the OECD databases except for the population data which is taken from United Nations database. We control for business cycle fluctuations and demographics as both have an effect on both social expenditure and poverty and inequality. We consider trade union density as a control for labor market institutions, as 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 15-64 years of age, population share 65 plus of age, gross capital formation (annual growth rate), education (share of population attained tertiary education, 25-64 years), export (as % of GDP) and inflation (consumer price all items, annual % 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 control variables are based on the papers of (Solow 1956; Barro 1996; Bellettini and Ceroni 2000; Barro 2013). All this data are taken from the OECD databases. See Table A.5.2 for the descriptive statistics of the control variables.

Empirical methodology 5.4

Endogeneity issues 5.4.1

We start this section with elaborating on the reverse causality issue. Not only social expenditure can have an effect on poverty, inequality and economic growth, but also the other way around. We expect a positive effect of poverty and inequality on social expenditure (Alesina and Rodrik 1994; Arjona et al. 2003; Milanovic 2000). This positive effect can be explained by the median voter who cares more about redistribution if 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 which we are studying. First of all, because the denominator of social expenditure as a percentage of GDP per capita increases, second because social expenditure is negatively related to the business cycle. This negative effect of GDP growth on social expenditure (as % of GDP) could translate in 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 can not 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 dependent variable in the growth models to reduce endogeneity problems even further (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 place affected by a change in social expenditure in the same period or the next period and 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 really 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 5.4.2

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. Afterwards, 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:

$$y_{it} = \alpha_t + \beta_i + X'_{it}\nu_x + \gamma SE_{it-1} + \epsilon_{it}. \tag{5.1}$$

$$SE_{it-1} = \alpha_t + \beta_i + \delta SE_{it-2} + X'_{it}\nu_x + \mu_{it} \tag{5.2}$$

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 (X'_{it}) with coefficients ν_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, specification 5 gives our most preferred model, given by regression equations (3) and (4):

$$y_{it} = \alpha_t + \beta_i + X'_{it}\nu_x + \gamma SE_{it-1} + \mu_{it} \tag{5.3}$$

$$\mu_{it} = \rho\mu_{it-1} + \epsilon_{it} \tag{5.4}$$

We prefer this OLS model over the 2SLS model as we can not 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.

5.5 Results

5.5.1 Main results

Table 5.3 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 one percentage point increase in total social expenditure is associated with a 0.337 percentage point lower poverty level one year later. Also increases in GDP per capita, the population share 15-64 years of age, the population share 65 plus and the union density rate are associated with lower poverty rates. However, these coefficients are smaller than the coefficient for total public social expenditure.

Table 5.3: Estimation results of total public social expenditure on poverty

	(1)	(2)	(3)	(4)	(5)
	Poverty	Poverty	Poverty	Poverty	Poverty
Total pub. SE (t-1)	−0.237***	−0.409***	−0.372***	−0.431***	−0.337***
	(0.053)	(0.080)	(0.107)	(0.077)	(0.074)
GDP per. c. (t-1)	0.020	0.027	−0.162	−0.180**	−0.147 **
	(0.038)	(0.027)	(0.117)	(0.086)	(0.059)
Unemp. rate (t-1)	0.085	0.303***	0.032	0.030	0.037
	(0.059)	(0.083)	(0.072)	(0.049)	(0.040)
Pop. 15-64 (t-1)	−0.130	−0.369	−0.275	−0.371**	−0.286*
	(0.246)	(0.246)	(0.272)	(0.172)	(0.170)
Pop. 65+ (t-1)	0.246	0.583**	−0.209	−0.269**	−0.223*
	(0.171)	(0.249)	(0.160)	(0.126)	(0.133)
U. density (t-1)	−0.058***	−0.032**	−0.102***	−0.092***	−0.097***
	(0.020)	(0.014)	(0.038)	(0.023)	(0.016)
Control variables	Yes	Yes	Yes	Yes	Yes
Year dummies	No	Yes	Yes	Yes	Yes
Country FE	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
Countries	22	22	22	21	22

Notes * denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table 5.4 shows the relation between total public social expenditure (t-1) and poverty, Gini and GDP growth in our preferred model. Tables A.5.3 and A.5.4 in the appendix show the six different regression models for inequality and growth. In Table 5.4, we find a negative significant coefficient of total public social expenditure on inequality of −0.0038, which is 9% of the standard deviation of Gini. This coefficient seems small but is large compared to the coefficients of GDP per capita (−0.0018), unemployment rate (−0.0008) and the union density (−0.0006), which are the controls that are significantly related to the Gini, see Table A.5.3. In column 3, we find a positive but statistically insignificant coefficient for

Table 5.4: Estimation results of total public social expenditure on poverty, inequality and GDP growth

	(1) Poverty	(2) Gini	(3) GDP growth
Total pubic SE (t-1)	−0.337***	−0.0038***	0.142
	(0.074)	(0.0005)	(0.102
GDP per capita (t-1)	−0.147**	−0.0018***	
	(0.059)	(0.0004)	
Unemployment rate (t-1)	0.037	0.0008***	
	(0.040)	(0.0002)	
Union density (t-1)	−0.097***	−0.0006**	
	(0.016)	(0.0002)	
Population 15-64 (t-1)	−0.286*	−0.0019	−0.118
	(0.170)	(0.0019)	(0.261)
Population 65 plus (t-1)	−0.223*	−0.0012	−0.222
	(0.133)	(0.0013)	(0.293)
Capital form. 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)
Control variables	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Country FE	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

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

total public social expenditure on GDP growth. Finding a statistically insignificant coefficient may explain why the effect of social protection on GDP growth is still disputed in the academic literature. In Table A.5.4 we present the other models for growth and we find a negative significant relation in specifications 1-3, 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 5.5: Estimation results of different kinds of social expenditure on poverty, inequality and GDP growth

	(1) Poverty	(2) Gini	(3) GDP growth
Old age & Survivor SE (t-1)	−0.197	−0.0058***	0.275
	(0.152)	(0.0009)	(0.254)
Incapacity SE (t-1)	−0.061	−0.0009	0.023
	(0.324)	(0.0027)	(0.279)
Health SE (t-1)	−0.021	−0.0015	−0.033
	(0.154)	(0.0009)	(0.222)
Family SE (t-1)	−1.156***	−0.0108***	0.576
	(0.215)	(0.0035)	(0.466)
Unempl. & ALMPS SE (t-1)	−0.429***	−0.0021	−0.332
	(0.141)	(0.0018)	(0.291)
Housing & Others SE (t-1)	−0.794**	0.0037	1.211*
	(0.367)	(0.0028)	(0.644)
GDP per capita (t-1)	−0.146**	−0.0021***	
	(0.063)	(0.0005)	
Unemployment rate (t-1)	0.029	0.0010***	
	(0.037)	(0.0002)	
Union density (t-1)	−0.078***	−0.0007**	
	(0.016)	(0.0003)	
Population 15-64 (t-1)	−0.183	−0.0004	−0.187
	(0.186)	(0.0018)	(0.264)
Population 65 plus (t-1)	−0.114	−0.0003	−0.341
	(0.165)	(0.0012)	(0.322)
Capital form. 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)
Control variables	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Country FE	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

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

We use the same preferred models to examine the relationships between the different social expenditure types and poverty, inequality and GDP growth, see Table 5.5. 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 one

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 survivor* (−0.0058) and *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. A one percentage point increase 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. Although, countries spend on average only 0.7% of GDP on *housing and others* indicating that this spending category still plays only a small role as determinant of GDP growth. The results in Table 5.5 suggest large differences in effects between the different social expenditure schemes, providing policy makers with the possibility to target more accurately when picking 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 survivor* and *health*, are particularly interesting to look at. *Old age and survivor* expenditure is negatively and significantly related to inequality but there is no statistically significant relation to poverty nor to GDP growth. Finding a strong negative relation with the Gini but no statistically significant effect on poverty indicates that the groups in the middle of the income distribution benefit most from spending on *old age and survivor*. The large positive coefficient for *old age and survivor* on GDP growth indicates that there is at least no large negative association between spending on *old age and survivor* and GDP growth. For *health* expenditure, we find no significant relationship with any of the outcome variables.

In Table A.5.5, 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 5.5.2

Finally, we run a large number of additional robustness checks. The results are almost the same for the effects of 'total public and private mandatory social expenditure' (Table A.5.6) and 'total social expenditure' (including voluntary private social expenditure) (Table A.5.7). We also study the relation with net total public social expenditure and net total public and private social expenditure, see Table A.5.8 and Table A.5.9.[2] These indicators capture the amount of actually received social benefits much better, but much less data is available for the net indicator. Furthermore, the quality of the data is limited. Also for net social expenditure we find results that are similar to our results for gross total social expenditure.

In table A.5.10 we look at the effects for a sample of 32 OECD countries for our poverty and inequality models and 33 OECD countries for our growth models.[3] The coefficient size of total public social expenditure on 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 public social expenditure is statistically significant when we consider the sample of OECD countries, 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 table A.5.11, we find very similar results using 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.5.12 shows again

[2]Because of missing data, the sample for the analysis of net social expenditure is excluding Greece, Hungary, Latvia, Luxembourg and Portugal for the poverty and inequality models and excludes Latvia in the growth model.

[3]Countries in OECD sample: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, 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.

similar results when we include only one social expenditure category in the model at a time. The negative coefficients of *incapacity* spending on poverty as well as on the Gini turn significant now. When we separate *housing and other*, in Table A.5.12, we still find a positive significant coefficient for '*other*' (mostly social assistance) on GDP growth.

In Table A.5.13, we show the results for the years 2008-2015. We find a smaller negative coefficient for total public social expenditure on poverty and inequality and a larger positive coefficient, but statistically insignificant, for public social expenditure on GDP growth. Table A.5.14 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 Table A.5.13 and A.5.14 are not statistically significant for poverty and GDP growth.[4] Although not statistically significant, the coefficient size of total public social expenditure on GDP growth is more than two times larger for the years 2008-2015 than 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. Also, it is possible that the effect of social expenditure on GDP growth has become more positive over time, independent of the business cycle.[5]

We also study if our results are robust for the working age population. In Table A.5.15 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* do

[4]Table A.5.14 suggests a stronger negative relationship between total public social expenditure and the Gini in the period 1990-2007 than in the period 2008-2015.

[5]A change in this relationship over time would be in line with our finding of a positive coefficient of the interaction between social expenditure and a timetrend on GDP growth (results are available on request). This would also be in line with finding a negative relationship between social expenditure and growth in some older studies, whereas most recent studies find a positive relationship. This change over time in the relationship between social expenditure and GDP growth may partly be explained by ageing populations as we also find a positive coefficient for the interaction between social expenditure and the population share 65 plus on GDP growth (results are available on request). However, this interaction term with population share 65 plus is much smaller than the interaction with a timetrend and is not statistically significant. Therefore, ageing is unlikely to be the only reason why the relationship between social expenditure and GDP growth may have become more positive over time.

also have the strongest negative relation with poverty for the working age population. A counter-intuitive statistically significant positive association is found between spending on *incapacity* and poverty among the working age population. Spending on *old age and survivor* and *family* are again negatively related to inequality when we consider the working age population. For GDP growth, our findings are robust when we study the effect of total public social expenditure on growth rates for GDP per member of the working age population (results are available on request). This is in line what we expected as we have already controlled for demographic structure in our preferred models.

Table A.5.16 gives the results for a poverty rate of 60% instead of the 50% poverty rate. On average 16.1% of the people in the EU had an income of less than 60% of the median income (Table A.5.2), whereas only 9.2% of the people had an income of less than 50% of the median income (Table5.2). Studying the relationship between total public social expenditure and the 60% poverty rate, in Table A.5.16 Column 1, gives a coefficient of 0.570. In column 2, we study how the different social expenditure types are related to the 60% poverty rate. We find again substantial negative significant coefficients for social expenditure on *family* and *unemployment and ALMPS*, but the large negative coefficient of *Housing and Others* turns statistically insignificant. Most interesting is the negative relation between *Old age and Survivor* which becomes stronger and statistically significant, with a coefficient of -0.504. When we compare the differences in results between the 50% and 60% poverty rates we can infer the following: *Housing and Others* are most effective in reducing poverty among the poorest decentile, whereas *Old age and Survivor* spending is reducing poverty among the second decentile of the income distribution.

In a final robustness test we consider different time lags for our explanatory variables. Table A.5.17 shows that the negative relation between total public social expenditure and poverty is almost exactly the same when we use different time lags. Table A.5.18 presents that total public social expenditure remains negatively and significant related to the Gini, but the coefficient size decreases to -0.0019 when we consider a 5-year time lag. For GDP growth, we find that our results are robust for different time lags, except for a larger positive and statistically significant coefficient when

we consider a 5-year time lag, see Table A.5.19. This result provides some evidence that the relationship between social expenditure and growth is not only a short run relation caused by an aggregated demand effect, but that the positive effect can be considered to be a long-run effect.

5.6 Conclusion

In this paper, we 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 on the one hand and increasing GDP growth on the other. The negative effect on poverty and inequality corresponds with the literature (Caminada and Goudswaard 2009; Wang et al. 2012; Wang et al. 2014). Finding no significant relation with GDP growth is in line with Bellettini and Ceroni 2000; Thewissen 2013; Ostry et al. 2014, who find no negative effect of social expenditure on economic growth.

Second, we find substantial differences in 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 et al. (2014) for more research on the mechanisms at play to make redistribution as efficient as possible.

Our results suggest that social expenditure types targeted at *families* are most strongly negatively related to both poverty and inequality. Social expenditure on *unemployment and ALMPs* and *housing and others* (mostly social assistance) are also effective ways of reducing poverty but are not reducing the Gini (for income inequality). Social expenditure on *old age and survivor* is negatively related to 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, while social expenditure on *old age and*

survivor has a more universal character to the benefit of a larger group of people. However, the budget size of the targeted expenditure schemes is relatively small and therefore the effect of old age expenditure is still relatively important as much larger amounts are spent on the *old age and survivor* category.

For GDP growth, finding a strong positive relationship with social expenditure on *housing and others* indicates that the best targeted social expenditure schemes are 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 can mainly be explained by the gap between the bottom and the middle of the income distribution. This positive association between spending on *housing and others* and GDP growth could be explained by the positive effects of the safety net on the potential of the poor, the development of skills, levels of risk-taking and aggregate demand. Potential negative effects on labor supply may be compensated by higher levels of productivity when more 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.

All in all, we can conclude that the expenditure types most effective in reducing poverty are also positively related to economic growth, indicating that there is no evidence for a trade-off between redistribution and economic growth. Second, the more universal expenditure types (*old age and survivor* and *family*) are most effective in reducing the Gini for income inequality, which is in line with Korpi and Palme (1998).

5.A Supplementary material

Table A.5.1: The OECD social expenditure categories

Category	Description
Old-age	Pensions, early retirement pensions, home-help and residential services for the elderly.
Survivors	Pensions and funeral payments.
Incapacity	Care services, disability benefits, benefits accruing from occupational injury and accident legislation, employee sickness payments.
Health	Spending on in- and out-patient care, medical goods, prevention.
Family	Child allowances and credits, childcare support, income support during leave and sole parent payments.
ALMPS	Active labour market policies: employment services, training youth measures subsidized employment, employment measures for the disabled.
Unemployment	Unemployment compensation, severance pay and early retirement for labour market reasons.
Housing	Housing allowances and rent subsidies.
Other	Social policy areas, non-categorical cash benefits to low-income households, other social services; i.e. support programs such as food subsidies.

Description of the different categories is taken from OECD (2007)

Table A.5.2: Descriptive statistics: control variables 1990-2015 for EU-sample

Variable	Mean	Std. Dev.	Min	Max	Obs
Total public and mandatory private SE	22.4	4.7	11.1	35.2	534
Total public and private SE	24.1	5.4	11.2	37.6	534
Net public SE	20.0	3.3	12.1	28.0	159
Net total SE	21.7	3.7	13.0	31.2	159
GDP per capita	31.6	13.5	8.0	91.4	562
Unemployment rate	8.9	4.3	1.0	27.5	528
Population 15-65	67.1	1.8	61.4	72.2	572
Population 65 plus	15.5	2.4	10.0	22.4	572
Union density	35.3	21.6	2.4	93.9	486
Capital formation growth	2.9	10.6	-41.7	49.8	554
Education	24.3	8.7	6.1	45.9	434
Export share	50.2	30.7	14.0	222.7	563
Inflation	8.5	53.5	-4.5	951.7	558
Poverty working	7.0	3.1	2.8	15.1	236
Poverty 1865	8.6	2.8	3.6	16.5	315
Gini 1865	0.29	0.4	0.21	0.39	317
Poverty 60%	16.1	3.6	7.9	26.2	290

Table A.5.3: Total public social expenditure on Gini: base results

	(1) Gini	(2) Gini	(3) Gini	(4) Gini	(5) Gini	(6) Gini
Total pubic SE (t-1)	−0.0006	−0.0029***	−0.0060***	−0.0041***	−0.0049***	−0.0038***
	(0.0009)	(0.0009)	(0.0014)	(0.0008)	(0.0009)	(0.0005)
GDP per capita (t-1)		0.0008	0.0003	−0.0021**	−0.0023***	−0.0018***
		(0.0005)	(0.0003)	(0.0009)	(0.0008)	(0.0004)
Unemployment rate (t-1)		0.0015**	0.0029***	0.0008	0.0009*	0.0008***
		(0.0007)	(0.0008)	(0.0007)	(0.0005)	(0.0002)
Population 15-64 (t-1)		−0.0025	−0.0132***	−0.0024	−0.0035*	−0.0019
		(0.0035)	(0.0038)	(0.0024)	(0.0021)	(0.0019)
Population 65 plus (t-1)		0.0021	0.0022	−0.0015	−0.0030**	−0.0012
		(0.0028)	(0.0027)	(0.0015)	(0.0015)	(0.0013)
Union density (t-1)		−0.0007**	−0.0008***	−0.0005	−0.0005*	−0.0006
		(0.0003)	(0.0002)	(0.0004)	(0.0003)	(0.0002)
Control variables	No	Yes	Yes	Yes	Yes	Yes
Year dummies	No	No	Yes	Yes	Yes	Yes
Country fixed effects	No	No	No	Yes	Yes	Yes
Ar1 component	No	No	No	No	No	Yes
Method	OLS	OLS	OLS	OLS	2SLS	OLS
Standard errors	Robust	Robust	Robust	Robust	Robust	PCSE
Observations	303	275	275	275	270	275
R-squared	0.161	0.537	0.706	0.952	0.4657	0.9634
Number of countries	22	22	22	22	21	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.4: Total public social expenditure on GDP growth: base results

	(1) GDP growth	(2) GDP growth	(3) GDP growth	(4) GDP growth	(5) GDP growth	(6) GDP growth
Total pubic SE (t-1)	−0.120**	−0.126**	−0.088**	0.019	0.072	0.142
	(0.051)	(0.056)	(0.043)	(0.109)	(0.071)	(0.102)
Cap. for. gr. (t-1)		0.044***	0.058***	0.055***	0.056***	−0.001
		(0.016)	(0.017)	(0.017)	(0.014)	(0.013)
Education (t-1)		−0.032	−0.019	−0.015	−0.027	−0.006
		(0.023)	(0.024)	(0.087)	(0.049)	(0.056)
Export (t-1)		0.003	0.011	0.062**	0.066***	0.056**
		(0.006)	(0.009)	(0.031)	(0.021)	(0.028)
Inflation (t-1)		−0.219***	−0.148**	−0.143**	−0.140***	−0.096*
		(0.079)	(0.064)	(0.071)	(0.049)	(0.057)
Pop. 15-64 (t-1)		−0.290**	−0.171	−0.272	−0.236*	−0.118
		(0.113)	(0.161)	(0.276)	(0.137)	(0.261)
Pop. 65 plus (t-1)		−0.474***	−0.349***	−0.300	−0.300*	−0.222
		(0.073)	(0.124)	(0.332)	(0.170)	(0.293)
Control variables	No	Yes	Yes	Yes	Yes	Yes
Year dummies	No	No	Yes	Yes	Yes	Yes
C. fixed effects	No	No	No	Yes	Yes	Yes
Ar1 component	No	No	No	No	No	Yes
Method	OLS	OLS	OLS	OLS	2SLS	OLS
Standard errors	Robust	Robust	Robust	Robust	Robust	PCSE
Observations	513	406	406	406	401	406
R-squared	0.063	0.265	0.576	0.655	0.564	0.610
Numb. of countries	22	22	22	22	22	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.5: Estimation results of different categories of social expenditure on poverty, inequality and GDP growth: One social expenditure category in the model at a time

	(1) Poverty	(2) Gini	(3) GDP growth
Old age and Survivor SE (t-1)	−0.226	−0.0060***	0.280
	(0.151)	(0.0010)	(0.232)
Incapacity SE (t-1)	−0.366	−0.0055***	−0.015
	(0.324)	(0.0018)	(0.308)
Health SE (t-1)	−0.181	−0.0009	0.105
	(0.177)	(0.0016)	(0.221)
Family SE (t-1)	−1.430***	−0.0124***	0.740
	(0.205)	(0.0031)	(0.471)
Unemployment and ALMPS SE (t-1)	−0.808***	−0.0063***	0.014
	(0.133)	(0.0014)	(0.241)
Housing and Others SE (t-1)	−0.992**	0.0032	1.243**
	(0.400)	(0.0036)	(0.576)
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	275-277	403-409
Number of countries	22	22	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.6: Estimation results of total public and mandatory private social expenditure on poverty, inequality and GDP growth

	(1) Poverty	(2) Gini	(3) GDP growth
Total public and mandatory private SE (t-1)	−0.308***	−0.0030***	0.138
	(0.068)	(0.0004)	(0.099)
GDP per capita (t-1)	−0.134**	−0.0015***	
	(0.056)	(0.0004)	
Unemployment rate (t-1)	0.033	0.0007***	
	(0.040)	(0.0002)	
Union density (t-1)	−0.101***	−0.0006***	
	(0.016)	(0.0002)	
Population 15-64 (t-1)	−0.297*	−0.0017	−0.116
	(0.172)	(0.0018)	(0.261)
Population 65 plus (t-1)	−0.282*	−0.0016	−0.202
	(0.147)	(0.0013)	(0.290)
Capital formation growth (t-1)			−0.001
			(0.013)
Education (t-1)			−0.005
			(0.056)
Export (t-1)			0.056**
			(0.028)
Inflation (t-1)			−0.097*
			(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	0.922	0.9643	0.610
Number of countries	22	22	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.7: Estimation results of total public and private social expenditure on poverty, inequality and GDP growth

	(1) Poverty	(2) Gini	(3) GDP growth
Total public and private SE (t-1)	−0.320***	−0.0037***	0.163
	(0.074)	(0.0005)	(0.106
GDP per capita (t-1)	−0.132**	−0.0017***	
	(0.057)	(0.0004)	
Unemployment rate (t-1)	0.046	0.0010***	
	(0.040)	(0.0002)	
Union density (t-1)	−0.100***	−0.0006**	
	(0.017)	(0.0003)	
Population 15-64 (t-1)	−0.251	−0.0015	−0.108
	(0.165)	(0.0020)	(0.256)
Population 65 plus (t-1)	−0.236*	−0.0013	−0.201
	(0.135)	(0.0014)	(0.290)
Capital formation growth (t-1)			−0.001
			(0.013)
Education (t-1)			−0.007
			(0.056)
Export (t-1)			0.057**
			(0.028)
Inflation (t-1)			−0.095*
			(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	0.921	0.9643	0.612
Number of countries	22	22	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.8: Estimation results of NET public social expenditure on poverty, inequality and GDP growth

	(1) Poverty	(2) Gini	(3) GDP growth
Net public social expenditure (t-1)	−0.298***	−0.0038***	−0.065
	(0.107)	(0.0003)	(0.147)
GDP per capita (t-1)	−0.182***	−0.0039***	
	(0.049)	(0.0007)	
Unemployment rate (t-1)	0.007	0.0009*	
	(0.034)	(0.0004)	
Union density (t-1)	−0.110**	−0.0013***	
	(0.051)	(0.0003)	
Population 15-64 (t-1)	−0.041	0.0001	−1.095*
	(0.211)	(0.0012)	(0.578)
Population 65 plus (t-1)	−0.063	−0.0011	−0.262
	(0.243)	(0.0014)	(0.363)
Capital formation growth (t-1)			−0.045
			(0.030)
Education (t-1)			0.184
			(0.127)
Export (t-1)			0.041
			(0.049)
Inflation (t-1)			0.037
			(0.187)
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	105	105	136
R-squared	0.932	0.9728	0.760
Number of countries	17	17	21

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.9: Estimation results of NET total social expenditure on poverty, inequality and GDP growth

	(1) Poverty	(2) Gini	(3) GDP growth
Net total social expenditure	−0.271***	−0.0032***	−0.002
	(0.102)	(0.0003)	(0.154)
GDP per capita (t-1)	−0.191***	−0.0038***	
	(0.050)	(0.0007)	
Unemployment rate (t-1)	−0.005	0.0007	
	(0.037)	(0.0005)	
Union density (t-1)	−0.122**	−0.0015***	
	(0.055)	(0.0004)	
Population 15-64 (t-1)	−0.118	−0.0010	−1.032*
	(0.228)	(0.0017)	(0.594)
Population 65 plus (t-1)	−0.134	−0.0019	−0.226
	(0.270)	(0.0017)	(0.380)
Capital formation growth (t-1)			−0.043
			(0.030)
Education (t-1)			0.174
			(0.126)
Export (t-1)			0.043
			(0.049)
Inflation (t-1)			0.053
			(0.181)
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	105	105	136
R-squared	0.929	0.9643	0.759
Number of countries	17	17	21

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.10: Estimation results of total pubic social expenditure on poverty, inequality and GDP growth: OECD countries

	(1) Poverty	(2) Gini	(3) GDP growth
Total pubic SE (t-1)	−0.239***	−0.0017***	0.134**
	(0.043)	(0.0005)	(0.060)
GDP per capita (t-1)	−0.098**	0.0003	
	(0.049)	(0.0007)	
Unemployment rate (t-1)	0.044	0.0009***	
	(0.034)	(0.0002)	
Union density (t-1)	−0.073***	0.0001	
	(0.018)	(0.0002)	
Population 15-64 (t-1)	−0.177	−0.0024**	−0.053
	(0.119)	(0.0011)	(0.152)
Population 65 plus (t-1)	0.001	−0.0004	−0.052
	(0.101)	(0.0009)	(0.185)
Capital formation growth (t-1)			0.000
			(0.007)
Education (t-1)			0.013
			(0.034)
Export (t-1)			0.054***
			(0.013)
Inflation (t-1)			−0.072**
			(0.032)
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	382	382	595
R-squared	0.953	0.9794	0.589
Number of countries	32	32	33

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.11: Estimation results of different social expenditure categories on poverty, inequality and GDP growth: OECD countries

	(1)	(2)	(3)
	Poverty	Gini	GDP growth
Old age and Survivor SE (t-1)	−0.165	−0.0023***	0.238
	(0.103)	(0.0008)	(0.214)
Incapacity SE (t-1)	−0.004	−0.0008	0.118
	(0.213)	(0.0022)	(0.174)
Health SE (t-1)	−0.031	0.0015	0.025
	(0.066)	(0.0010)	(0.120)
Family SE (t-1)	−1.044***	−0.0115***	0.235
	(0.156)	(0.0032)	(0.285)
Unemployment and ALMPS SE (t-1)	−0.428***	−0.0023*	−0.239
	(0.142)	(0.0013)	(0.212)
Housing and Others SE (t-1)	−0.528***	−0.0021	0.486
	(0.181)	(0.0034)	(0.466)
GDP per capita (t-1)	−0.152***	−0.0003	
	(0.046)	(0.0006)	
Unemployment rate (t-1)	0.039	0.0010***	
	(0.029)	(0.0002)	
Union density (t-1)	−0.078***	0.0000	
	(0.017)	(0.0002)	
Population 15-64 (t-1)	−0.125	−0.0013	−0.150
	(0.099)	(0.0014)	(0.171)
Population 65 plus (t-1)	0.005	0.0007	−0.152
	(0.093)	(0.0011)	(0.236)
Capital formation growth (t-1)			0.004
			(0.008)
Education (t-1)			0.027
			(0.032)
Export (t-1)			0.051***
			(0.014)
Inflation (t-1)			−0.102***
			(0.036)
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	372	372	552
R-squared	0.956	0.9793	0.601
Number of countries	31	31	31

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.12: Estimation results of total pubic social expenditure on poverty, inequality and GDP growth: OECD countries : One social expenditure category in the model at a time

	(1) Poverty	(2) Gini	(3) GDP growth
Old age and Survivor SE (t-1)	−0.147	−0.0022***	0.320
	(0.112)	(0.0008)	(0.196)
Incapacity SE (t-1)	−0.421**	−0.0043**	0.175
	(0.201)	(0.0018)	(0.146)
Health SE (t-1)	−0.143*	0.0004	0.108
	(0.080)	(0.0011)	(0.113)
Family SE (t-1)	−1.222***	−0.0119***	0.300
	(0.147)	(0.0030)	(0.264)
Unemployment and ALMPS SE (t-1)	−0.729***	−0.0053***	0.043
	(0.117)	(0.0011)	(0.170)
Housing SE	−1.690***	−0.0074	0.205
	(0.263)	(0.0079)	(0.922)
Others SE	−0.485**	−0.0003	0.824**
	(0.246)	(0.0032)	(0.407)
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	372-384	372-382	573-598
Number of countries	31-32	31-32	32-33

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.13: Estimation results of total pubic social expenditure on poverty, inequality and GDP growth: Years 2008-2015

	(1)	(2)	(3)
	Poverty	Gini	GDP growth
Total pubic SE (t-1)	−0.210***	−0.0011**	0.235
	(0.073)	(0.0005)	(0.194)
GDP per capita (t-1)	−0.176***	−0.0018***	
	(0.044)	(0.0006)	
Unemployment rate (t-1)	−0.014	−0.0000	
	(0.030)	(0.0001)	
Union density (t-1)	0.035	0.0008	
	(0.034)	(0.0006)	
Population 15-64 (t-1)	−0.467***	0.0000	−1.602***
	(0.062)	(0.0015)	(0.433)
Population 65 plus (t-1)	−0.566***	0.0008	−0.988
	(0.143)	(0.0033)	(0.610)
Capital formation growth (t-1)			0.016
			(0.016)
Education (t-1)			0.182*
			(0.095)
Export (t-1)			0.033
			(0.034)
Inflation (t-1)			−0.211**
			(0.105)
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	133	133	154
R-squared	0.967	0.9800	0.697
Number of countries	22	22	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.14: Estimation results of total pubic social expenditure on poverty, inequality and GDP growth: Years 1990-2007

	(1)	(2)	(3)
	Poverty	Gini	GDP growth
Total pubic SE (t-1)	−0.187	−0.0046***	0.090
	(0.130)	(0.0012)	(0.147)
GDP per capita (t-1)	0.229	0.0010	
	(0.353)	(0.0030)	
Unemployment rate (t-1)	0.131	0.0020**	
	(0.139)	(0.0010)	
Union density (t-1)	−0.114**	−0.0001	
	(0.054)	(0.0007)	
Population 15-64 (t-1)	−0.602	−0.0057	0.003
	(0.506)	(0.0051)	(0.284)
Population 65 plus (t-1)	−0.019	0.0020	0.147
	(0.304)	(0.0029)	(0.394)
Capital formation growth (t-1)			−0.012
			(0.023)
Education (t-1)			0.023
			(0.070)
Export (t-1)			0.085*
			(0.049)
Inflation (t-1)			−0.097*
			(0.054)
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	Robust	Robust	PCSE
Observations	124	124	230
R-squared			0.709
Number of countries	21	21	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.15: Different categories of social expenditure on poverty among working population and poverty and inequality among working age population

	(1) Poverty Working	(2) Poverty Working	(3) Poverty 18-65	(4) Poverty 18-65	(5) Gini 18-65	(6) Gini 18-65
Total pubic SE (t-1)	−0.068		−0.237***		−0.0032***	
	(0.055)		(0.035)		(0.0008)	
Old & Surv. SE (t-1)		−0.231		−0.110*		−0.0054***
		(0.196)		(0.058)		(0.0009)
Incapacity SE (t-1)		1.056***		0.276**		−0.0001
		(0.188)		(0.113)		(0.0023)
Health SE (t-1)		0.078		0.067		−0.0005
		(0.186)		(0.046)		(0.0009)
Family SE (t-1)		−0.439		−0.681***		−0.0092***
		(0.372)		(0.147)		(0.0036)
Un. & almps SE (t-1)		−0.456**		−0.685***		−0.0022
		(0.182)		(0.133)		(0.0022)
Hous. & oth. SE (t-1)		−1.657***		−0.752***		0.0016
		(0.632)		(0.205)		(0.0026)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Ar1 component	Yes	Yes	Yes	Yes	Yes	Yes
Method	OLS	OLS	OLS	OLS	OLS	OLS
Standard errors	PCSE	PCSE	PCSE	PCSE	PCSE	PCSE
Observations	213	213	273	273	275	275
R-squared	0.803	0.817	0.930	0.939	0.965	0.969
Number of countries	21	21	22	22	22	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.16: Different categories of social expenditure on the poverty rate 60%

	(1) Poverty 60% line	(2) Poverty 60% line
Total pubic SE (t-1)	−0.570***	
	(0.080)	
Old age and Survivor SE (t-1)		−0.504***
		(0.168)
Incapacity SE (t-1)		0.180
		(0.336)
Health SE (t-1)		−0.208
		(0.150)
Family SE (t-1)		−1.851***
		(0.213)
Unemployment and ALMPS SE (t-1)		−0.676***
		(0.146)
Housing and Others SE (t-1)		−0.670
		(0.482)
Year dummies	Yes	Yes
Controls	Yes	Yes
Fixed effects	Yes	Yes
Ar1 component	Yes	Yes
Method	OLS	OLS
Standard errors	PCSE	PCSE
Observations	258	258
R-squared	0.938	0.943
Number of countries	22	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.17: Total public social expenditure on poverty: different lags

	(1) Poverty	(2) Poverty	(3) Poverty	(4) Poverty	(5) Poverty	(6) Poverty
Total public SE	−0.370***	−0.372***	−0.369***	−0.311***	−0.327***	−0.339***
	(0.118)	(0.107)	(0.105)	(0.102)	(0.099)	(0.101)
GDP per capita	−0.178**	−0.162	−0.197	0.031	−0.017	−0.146
	(0.087)	(0.117)	(0.124)	(0.071)	(0.101)	(0.120)
Unemployment rate	0.048	0.032	0.030	0.108***	0.130**	0.078
	(0.073)	(0.072)	(0.053)	(0.042)	(0.052)	(0.066)
Population 15-64	−0.070	−0.275	−0.476	−0.608*	−0.591*	−0.611*
	(0.250)	(0.272)	(0.301)	(0.337)	(0.343)	(0.325)
Population 65 plus	−0.018	−0.209	−0.393	−0.424	−0.538*	−0.618*
	(0.181)	(0.160)	(0.247)	(0.270)	(0.289)	(0.320)
Union density	−0.090*	−0.102***	−0.116**	−0.081	−0.078*	−0.072
	(0.047)	(0.038)	(0.053)	(0.049)	(0.042)	(0.048)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Method	OLS	OLS	OLS	OLS	OLS	OLS
Standard errors	Robust	Robust	Robust	Robust	Robust	Robust
Lag	0	1	2	3	4	5
Observations	282	275	273	265	264	250
R-squared	0.916	0.926	0.926	0.930	0.922	0.922
Number of countries	22	22	22	21	22	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.18: Total public social expenditure on Gini: different lags

	(1) Gini	(2) Gini	(3) Gini	(4) Gini	(5) Gini	(6) Gini
Total public SE	−0.0034***	−0.0041***	−0.0034***	−0.0028**	−0.0027***	−0.0019*
	−0,001)	(0.0008)	(0.0010)	(0.0011)	(0.0010)	(0.0010)
GDP per capita	−0.0019***	−0.0021**	−0.0022**	−0.0007	−0.0005	−0.0017
	(0.0006)	(0.0009)	(0.0010)	(0.0005)	(0.0010)	(0.0011)
Unemployment rate	0.0006	0.0008	0.0007	0.0013**	0.0012**	0.0005
	(0.0006)	(0.0007)	(0.0006)	(0.0005)	(0.0006)	(0.0006)
Population 15-64	−0.0013	−0.0024	−0.0047*	−0.0051*	−0.0070**	−0.0075**
	(0.0026)	(0.0024)	(0.0028)	(0.0030)	(0.0032)	(0.0032)
Population 65 plus	0.0006	−0.0015	−0.0033	−0.0037	−0.0064**	−0.0067**
	(0.0023)	(0.0015)	(0.0024)	(0.0026)	(0.0030)	(0.0032)
Union density	−0.0004	−0.0005	−0.0008	−0.0006	−0.0006	−0.0011**
	(0.0006)	(0.0004)	(0.0006)	(0.0005)	(0.0005)	(0.0005)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Method	OLS	OLS	OLS	OLS	OLS	OLS
Standard errors	Robust	Robust	Robust	Robust	Robust	Robust
Lag	0	1	2	3	4	5
Observations	282	275	273	265	264	250
R-squared	0.950	0.952	0.951	0.953	0.95	0.952
Number of countries	22	22	22	21	22	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.

Table A.5.19: Total public social expenditure on GDP growth: different lags

	(1)	(2)	(3)	(4)	(5)	(6)
	GDP growth	GDP growth	GDP growth	GDP growth	GDP growth	GDP growth
Total public SE	−0.123	0.142	0.104	0.060	0.133	0.277***
	(0.086)	(0.102)	(0.116)	(0.104)	(0.089)	(0.089)
Cap. for. gr.	0.047***	−0.001	−0.010	−0.011	0.009	−0.004
	(0.014)	(0.013)	(0.014)	(0.013)	(0.012)	(0.011)
Education	0.007	−0.006	0.020	0.013	0.011	−0.011
	(0.050)	(0.056)	(0.070)	(0.063)	(0.054)	(0.051)
Export	0.048**	0.056**	0.026	0.014	0.039	0.030
	(0.023)	(0.028)	(0.033)	(0.029)	(0.025)	(0.030)
Inflation	−0.129**	−0.096*	0.028	0.013	−0.055	−0.043
	(0.053)	(0.057)	(0.064)	(0.056)	(0.052)	(0.053)
Pop. 15-64	−0.231	−0.118	0.016	−0.134	−0.360	−0.297
	(0.211)	(0.261)	(0.303)	(0.274)	(0.229)	(0.249)
Pop. 65 plus	−0.172	−0.222	−0.035	−0.247	−0.481	−0.622**
	(0.236)	(0.293)	(0.358)	(0.329)	(0.316)	(0.303)
1-13 Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Ar1 component	Yes	Yes	Yes	Yes	Yes	Yes
Method	OLS	OLS	OLS	OLS	OLS	OLS
Standard errors	PCSE	PCSE	PCSE	PCSE	PCSE	PCSE
Lags	0	1	2	3	4	5
Observations	427	406	384	362	340	318
R-squared	0.681	0.610	0.585	0.597	0.618	0.633
Num. of countries	22	22	22	22	22	22

* denotes significant at the 10% level, ** at the 5% level and *** at the 1% level.