Growing apart: The comparative political economy of income inequality and social policy development in affluent countries

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4 Is it the income distribution or redistribution that affects growth?[1]

Abstract

This chapter addresses the central question in political economy how the objectives of attaining economic growth and restricting income inequality are related. Thus far few studies explicitly distinguish between effects of income inequality as such and effects of redistributing public interventions to equalise incomes on economic growth. In fact, most studies rely on data that do not make this distinction properly and in which top-coding is applied so that enrichment at the top end of the distribution is not adequately captured. This study aims to contribute using a pooled time-series cross-section design covering 29 countries, using OECD, LIS, and World Top Income data. No robust association between inequality and growth or redistribution and growth is found. Yet there are signs for a positive association between top incomes and growth, although the coefficient is small and a causal interpretation does not seem to be warranted.

4.1 Introduction

The attainment of economic growth and the restraining of income inequality are amongst the most important socio-economic objectives of welfare states. Economic expansion implies a higher aggregate standard of living and more utility-enhancing consumption possibilities for society as a whole. The goal of limiting income inequality pertains more to ideological concepts of fairness, humanitarianism and equality of human beings. Rawls (1971), for example, argues that societies should have 'fair equality of opportunities', enabling every citizen to pursue personal goals, not limited beforehand by financial con-

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straints. In addition, the objective of limiting inequality is generally linked to the provision of a certain level of income security guaranteed by the state.

The question of what the core objectives of society should be is largely ideological. Conversely, how the objectives of economic growth and limited income inequality can be reached is a more technical question, although not less contested in academic and political debates. The crux here is whether states are able to stimulate economic growth whilst at the same time limit income inequality through their policies – or the absence of them. To attain high economic growth, policies should not have too high costs in terms of forgone output, and the (financing of) public expenditures should not negatively affect incentives beneficial to growth (OECD, 2012d). Limiting income inequality requires that state actions are relatively more beneficial to people with low income more in the long run.

States play an important role in alleviating inequality by redistributing income (Brady, 2003). The general view in economics, however, is that redistribution based on economic outcomes such as income reduces marginal benefits of gaining wealth, leading to lower incentives, which retards growth. Okun (1975) coins this the 'big trade-off ', as this negative effect of redistribution on the attainment of growth 'plagues us in dozens of dimensions of social policy'. The alleged trade-off is considered to be the primary problem for the contemporary welfare state by many politicians and researchers (Pierson and Castles, 2006; Sapir, 2006).

Another branch in political economy has focussed on the effects of income inequality on economic development (e.g., Voitchovsky, 2005; Barro, 2008). Inequality can affect growth by leading to more social unrest or by inhibiting people lacking financial means to invest in themselves to realise their potential, although it could also incite people to put forth additional efforts as the relative benefits are higher.

We might thus expect an effect from the income distribution as well as from the policies put in place to equalise incomes on economic growth. Yet surprisingly, few studies properly distinguish between those two effects. In the substantial amount of literature on the effects of income inequality on growth, hardly any study also takes into account effects through the redistributive system which might cause bias due to omitted variables (e.g., Aghion *et al.*, 1999; Banerjee and Duflo, 2003; Barro, 2008); a similar story holds for the redistribution to growth literature (e.g., Romer and Romer, 2010). In fact, in the often used Deininger and Squire (1996) database, no consistent distinction is made between the income distribution before and after government intervention through taxes and transfers (Banerjee and Duflo, 2003, p. 284). Moreover, studies generally only cover generic measures of inequality across the population in which top- and bottom-coding are applied. In this way, enrichment at the top, an important development in inequality, is left out of the analysis (Atkinson *et al.*, 2011).

This study investigates the associations between economic growth on the one hand and inequality and redistribution on the other; a primary problem for the contemporary welfare state and a question in which political science and economics collide (Pierson and Castles, 2006; Sapir, 2006; Lübker, 2007). The possible negative economic effects of the current widespread rise in inequality have also been expressed recently by international organisations (e.g., OECD, 2011a, 2012d, 2012e; ILO, 2012). Employing a pooled time-series cross-section design of a total of 29 OECD countries and using data from OECD and Luxembourg Income Study (LIS) that accurately differentiate between disposable and market income, this study does not find robust associations between generic measures of income inequality and economic growth, nor between redistribution and economic growth. Yet employing recently collected data from the World Top Incomes Database (Alvaredo *et al.*, 2012), this study finds signs for positive associations between the share of income held by the top end of the distribution and economic growth, although the coefficients are small.

4.2 THEORETICAL SECTION

4.2.1 Inequality and growth

Four main channels through which inequality can affect economic growth can be discerned in the existing literature. They all focus on actual income or income differences between people, and thus should be tested using inequality figures after taxes and transfers. Two lines of reasoning predict a positive effect. First, higher dispersion can incite people to put forth additional effort or to invest in their human capital, as the rewards of this additional effort are higher compared to the situation in an egalitarian society. Rooth and Stenberg (2011) provide exploratory evidence that income inequality in Swedish regions increased economic growth by stimulating commuting patterns. Within firms, a higher wage dispersion can enhance productivity (Mahy *et al.*, 2011). Second, if high income classes have higher marginal propensities to save, and if the rates of savings and investment are positively related, more unequal societies will grow relatively faster (Castelló-Climent, 2010). It could also be that a concentration of capital is crucial for the construction of new activities with high set-up costs (Galor and Tsiddon, 1997). Possibly, because of the internationalisation of the capital market, the relationship between inequality and savings has weakened. Firms in countries with lower saving rates can rely on the savings available in other countries to finance their investments.

Two reasons are commonly put forward for why inequality can slow down growth. First, more unequal societies might be less socio-politically stable as inequality lowers costs of participating in disruptive actions. This can reduce the security of property and contract rights and, ultimately, discourage invest-

ment (Keefer and Knack, 2002). Within this literature, a specific manifestation of inequality – called 'polarisation' by Esteban and Ray (2011) or in the international relations literature more commonly referred to as 'horizontal inequality' (e.g., Østby, 2008; Cederman *et al.*, 2011) – is said to be an important determinant of (growth-disrupting) tensions and civil war. Rather than inequality between individuals, these indicators refer to inequalities between certain (ethnic) groups. Yet inequalities between groups may play a less important role in affecting economic growth in developed countries because property rights are relatively well secured (Barro, 2008). In addition, data for developed countries on these measures are not universally available.[2] More tailored to developed countries, a number of arguably less mainstream studies claim that inequality has been a root cause of the current financial crisis by leading to structural economic imbalances. According to this perspective, increasing shareholder power and capital share of income, both manifested in higher levels of inequality, has led to a financial bubble and high levels of household debt, which eventually burst, severely affecting gross domestic product (GDP) (Hein, 2011; Stockhammer, 2013; Van Treeck, 2014). A second channel pertains to the alleged negative effects of inequality on the stock of human capital. Credit market imperfections inhibit people lacking financial means to fully realise their potential, dampening investment in human capital and overall knowledge building, thereby reducing economic output. As the economic importance of schooling has increased in current knowledge-based economies, this channel might have become more imperative (Galor, 2011).

It could be that developments at the top end of the distribution have distinctive effects on economic growth (Voitchovsky, 2005). The lines of reasoning about why inequality might stimulate growth might also hold for the level of concentration at the top end of the income distribution (Andrews *et al.*, 2011). High rewards can incite people to invest, and in particular, a concentration of asset ownership could facilitate large investments. Regarding negative effects, there is no reason to expect that high top income shares are associated with lower average stocks of human capital, which could be the case for inequality across the society. Yet it could be that the rich use their wealth to lobby for rent-seeking policies that disrupt growth (see also Hacker and Pierson, 2010).

A difficulty in understanding the consequences of inequality on growth is the possibility of reverse effects. Unless all people benefit in equal proportions to their income, growth itself also affects the income distribution. Growth might benefit the poor by leading to higher tax revenues and higher demands for goods produced by low-income groups, although other scholars

2 Esteban *et al.* (2007) calculate polarisation measures for five countries over time, whilst Duclos *et al.* (2004) consider a larger subset of developed countries, but only at two points in time. Also horizontal inequality data sets generally address (grids within) developing countries and are limited across time (Østby, 2008; Cederman *et al.*, 2011).

do not find evidence for this trickling down (Kenworthy, 2010). Famously, Kuznets (1955) argues that the long-term effect of growth on inequality shows an inverted U-shape pattern. During initial phases of development only part of the labour moves towards modern sectors, leading to a higher wage dispersion, whilst the rest lags behind. Eventually more and more people become active in this modern sector, leading to a catch-up and a more equalised distribution. In this sense, economic growth is the forerunner of income equality.

4.2.2 Redistribution and growth

Not only the level of inequality but also the policies put in place to equalise incomes through means-tested transfers or progressive taxing to finance public expenditures might affect growth (Goudswaard and Caminada, 2010). According to the well-known trade-off argument, the alteration of market outcomes by public redistribution leaves people to change their behaviour by reducing financial incentives to gain individual wealth (Allegrezza *et al.*, 2004). With lower marginal returns to work, substitution to leisure becomes more attractive. A related argument is that public provision, for example, in the form of unemployment benefits, can make people dependent on government support. The very creation of unemployment benefits might lead to higher unemployment rates, as people are less inclined to seek jobs (Kenworthy, 2003; Bassanini and Duval, 2006).

Empirical evidence for the trade-off hypothesis on the macro level is more mixed (see also the empirical literature overview in Online Appendix 1 of the *Socio-Economic Review* publication). Romer and Romer (2010) present macroeconomic evidence for 'exogenous tax changes' in the USA, which are fiscal changes implemented to influence long-term growth rather than short-term counter-cyclical reactions, using a VAR model. They estimate that a 1 per cent increase in exogenous tax lowers growth with 2.5 per cent permanently. Conversely, Lindert (2004) stresses that the welfare state is a free lunch. He shows that growth patterns of strongly redistributing states, for instance Sweden, have not been surpassed by economic growth in more liberal states such as the USA or the UK. According to Lindert, generous welfare states have come up with strategies to minimise behavioural changes, most notably by universal provision instead of means testing, and by relying on taxes for which elasticities are relatively low. According to Kenworthy (2003), the negative effects of public intervention on employment also prove better than expected from the trade-off argument. He only reports a weak negative effect of higher replacement rates on employment.

Other arguments focus on the alleged lower effectiveness of public allocation of recourses. Reallocation increases transaction costs, as aptly captured by Okun's (1975) metaphor of a leaky bucket: 'The money must be carried

from the rich to the poor in a leaky bucket. Some of it will simply disappear in the transit, the poor will not receive all the money that is taken from the rich'.

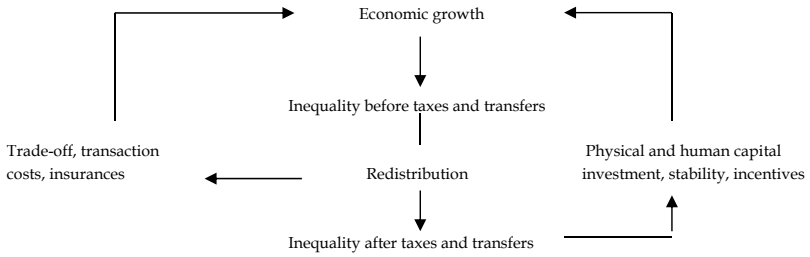
Public policies that potentially have redistributing effects may facilitate growth by publicly providing for insurances against risks, such as unemployment, disabilities and old age, that markets cannot (efficiently) provide for (Boadway and Keen, 2000). In addition, the existence of a safety net might also make people less risk-averse and more innovative, which might be beneficial to economic growth.

Yet there might also be a reverse effect in the situation that economic growth influences the need and demand for redistribution. Growth shapes possibilities for government provisions, such as public insurances against unemployment, sickness or on pensions, commonly referred to as Wagner's law (Meltzer and Richard, 1983). In addition, in a system with automatic stabilisers, greater inequality because of economic turmoil leads to more redistribution by default (Immervoll and Richardson, 2011). In addition, countries can implement short-term policies to respond to economic downturns, which are generally designed to stimulate employment and in this way affect redistributive levels (Chung and Thewissen, 2011).

4.2.3 Combining the lines of reasoning

Figure 4.1 schematically displays the arguments discussed earlier about why we might expect effects of income inequality and redistribution, in some way isolated from each other, on economic growth. Yet there are also likely to be direct links between redistribution and income inequality. All current welfare states decrease income inequality through redistribution (Immervoll and Richardson, 2011). This implies that the 'total' effect of redistribution on growth consists of a direct effect of redistribution on growth, and an effect on growth by alleviating income inequalities. For instance, in the scenario that inequality hampers growth, lowering it via redistribution can be seen as a social investment – so that 'the welfare state can be an irrigation system which supports economic efficiency and growth' (Korpi, 1985) – albeit with possible costs on its own.

Figure 4.1 Schematic overview of the hypotheses



There might also run a causal relationship from inequality to redistribution by influencing preferences for redistribution. If preferences are determined by income, then the majority will favour distorting redistribution when the (gross) mean income exceeds the (gross) median income (Lübker, 2007; Finseraas, 2010). Here, we should expect a negative effect of inequality before taxes and transfers on growth, by leading to more redistribution. Yet the empirical literature on the effects of inequality on the amount of redistribution is quite inconclusive. Kenworthy and McCall (2008) do not find any evidence for a positive effect of inequality before taxes and transfers on the level of redistribution, tracking eight countries during the 1980s and 1990s. Lübker (2007) also does not find evidence that public support for redistribution rises with inequality across countries.

Banerjee and Duflo (2003) also make use of political economy arguments, but they predict a nonlinear relationship between inequality and growth, concluding that 'growth rate is an inverted U-shape function of net changes in inequality'. According to them, changes in inequality in any direction are associated with lower growth. Based on a political economy model, they argue that 'planned changes in inequality' or 'hold-ups' are more common in situations of extreme equality and extreme inequality.

4.3 METHODOLOGY

4.3.1 Estimation methods

The inequality to growth literature from the 1990s generally connects a country's income distribution at the beginning of a long time period, usually around 30 years, to the average growth rate during that period (Persson and Tabellini, 1994; Rodrik and Alesina, 1994; Perotti, 1996). The regressions are estimated by ordinary least squares (OLS). By and large, the estimations report negative associations, leaving Benabou (1996) to argue that 'these regressions, run over a variety of data sets and periods with many different measures of income distribution, deliver a consistent message: initial inequality is detrimental to

long-run growth'. Yet OLS estimations yield biased results when unobserved time-invariant country effects, such as culture and adopted technological levels, are correlated with the included explanatory variables. Therefore, later studies turn to pooled time-series cross-sectional data to examine how changes in income distribution affected the growth rate in the subsequent 5- or 10-year period, mostly by using fixed effects estimation (Barro, 2000; Forbes, 2000; Castelló-Climent, 2004). Generally, the negative coefficient becomes insignificant.

Even though fixed effects estimation is unaffected by heterogeneity bias, it is quite sensitive to measurement error for relatively time-invariant stock variables. Monte Carlo studies indicate underestimation of the effects of physical and human capital in growth regressions (Hauk and Wacziarg, 2009). Because the levels of income inequality and redistribution are also relatively stable over time, fixed effects estimation might under-report those factors. A number of authors cope with these problems by using system-generalised method of moments (GMM) (Castelló-Climent, 2004; Voitchovsky, 2005). Yet GMM has disadvantages as well. The procedure of first-differencing and using lags as instruments involves a loss of multiple periods of data. In addition, its first-differenced nature does not allow for inclusion of the level of income as a control variable to account for conditional convergence (see Section 3.3).

This article uses fixed effects regressions, controlling for a set of growth determinants explained in Section 3.3 and unobserved heterogeneity across time and countries. To limit the possibility of reverse causality, inequality or redistribution at the beginning of the period is regressed on the average economic growth in the years after that period. Extensive sensitivity tests are conducted. Fixed-effects regressions are employed as Hausman tests indicate that the country effects are correlated with the other explanatory variables, even though all results still hold when random effects or pooled OLS is used which both exploit also the variation between countries, with coefficients of comparable size.[3]

4.3.2 Inequality and redistribution indicators

An important concern is the availability and quality of data, especially for the income distribution before taxes and transfers. The larger income inequality databases that include observations for developing countries suffer from measurement error, low comparability between countries and heterogeneity in survey design (Atkinson and Brandolini, 2001). Many studies, as can be seen in Online Appendix 1 of the *Socio-Economic Review* publication, rely on the Deininger and Squire (1996) income distribution database. This database

3 Results available on request.

does not consistently distinguish between the income distribution before and after taxes and transfers so that hypotheses cannot be tested properly (Banerjee and Duflo, 2003, p. 284). Moreover, these data sources generally do not adequately capture enrichment at the top due to top-coding, even though the surge of top incomes has been noted as an important trend in the distribution within affluent democracies with possibly distinctive effects on economic growth (Hacker and Pierson, 2010; Atkinson *et al.*, 2011).

Because data quality is such a main concern, this article employs data from three different sources. First, we use the OECD database on income distribution and poverty, which contains comparable country-level data for multiple distribution indicators after taxes and transfers, for entire and working-age population (OECD, 2011a). For inequality after taxes and transfers, we employ three indicators, namely, the Gini coefficient, the squared coefficient of variation (SCV) and the mean log deviation (MLD), for the entire and working-age population. The Gini is sensitive to changes around the middle of the distribution, whilst the SCV and MLD indicators are more sensitive to the upper and lower tail of the income distribution, respectively. For the distribution before taxes and transfers, only the Gini for the entire and working-age population are available. Even though we refer to these indicators as based on 'entire' and 'working-age population', they do not cover top incomes well due to top-coding.

Second, the Leiden LIS Budget Incidence Fiscal Redistribution Dataset is used, which contains data on inequality and redistribution standardised across countries and over time based on LIS household data (Wang and Caminada, 2011). Here, only the Gini for the entire population (in which again top incomes are not well covered due to top-coding) for primary and disposable income are available. The OECD and LIS data use the same income definition for disposable income (after taxes and transfers), and both apply a square root equivalence scale. Yet primary income from the LIS data is not exactly the same as income before taxes and transfers in the OECD data set, as primary income also includes private transfers and other cash income, although these are generally relatively small amounts (Caminada *et al.*, 2012). Another difference is that the LIS micro data are based on standardised surveys rather than questionnaires. The two measures after taxes and transfers, which we refer to as disposable income inequality, are highly correlated (0.91), whereas the correlation is lower between the OECD inequality indicator before taxes and transfers and primary income from LIS (0.72); we refer to these last indicators as market income inequality.

Third, we use the World Top Incomes Database (WTID), which contains information on the income shares of the top 10, 5, and 1 per cent per country over time to capture concentration of income at the top end of the distribution (Alvaredo *et al.*, 2012). The estimates are based on the amount of income reported to the tax authorities to an estimate of total personal income from the same year taken from a country's national accounts. Unfortunately, no

information on top income shares after taxes and transfers, and thus the amount of redistribution, is available. The three indicators are highly correlated (between 0.89 and 0.98).[4]

In line with Kenworthy and Pontusson (2005), redistribution is defined in an absolute fashion, namely, the difference between the Gini before and after taxes and transfers for the OECD data, and as the difference between the Gini for primary and disposable income for the LIS data. Absolute measures are not expressed relative to the market income distribution. In this way the coefficients are easier to interpret. Relative measures tracked over time are essentially the 'percentage change in percentage change' (Caminada *et al.*, 2012, p. 7). The absolute redistribution measures from OECD and LIS are highly correlated (0.86).

In total, 29 OECD member states are included in the regressions.[5] Because of data coverage, the exact country sample differs slightly per data set regression.[6] In total our data set contains eight periods of five years each, from 1970 to 2009. For the OECD data, no information is available for 1970–1974 and 1980–1984. All results shown are robust to the exclusion of a single country or period (unless stated otherwise).[7] Results are comparable when 10-year periods are used instead.[8] Our data set is unbalanced mainly due to missing observations for Eastern European countries; leaving out those countries does not affect the results in any significant way.

4 In Finland (1989) and Canada (1982) the data suffer from trend breaks due to changes in tax collection. The trends prior to the changes have been adjusted based on the average difference in overlapping years (1990–1992 for Finland, 1982–2000 for Canada). Missing years in Germany, Italy, the Netherlands, Portugal, Switzerland and the UK have been linearly interpolated.

5 Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Czech Republic (CZE), Denmark (DNK), Estonia (EST), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Hungary (HUN), Ireland (IRL), Israel (ISR), Italy (ITA), Japan (JPN), Luxembourg (LUX), the Netherlands (NLD), New Zealand (NZL), Norway (NOR), Poland (POL), Portugal (PRT), Slovenia (SVN), Spain (ESP), Sweden (SWE), Switzerland (CHE), Turkey, (TUR), the UK (GBR) and the US (USA). A limited number of observations are available for Mexico, but we exclude it because it is an outlier, combining low redistribution, high inequality and tempestuous growth.

6 For the OECD data, no information is available for EST and SVN for our main inequality indicator, the Gini after taxes and transfers. In addition to that, AUT, IRL, POL, ESP, CHE and TUR drop out for the redistribution regressions. For the LIS data, no information is available for JPN, NZL, PRT and TUR. Last, for the WTID, no data are available for AUT, BEL, CZE, EST, GRC, HUN, ISR, LUX, POL, SVN and TUR. JPN and IRL are excluded because they do not have data for all three top income indicators. The results shown still hold when JPN and IRL are included.

7 Results available on request.

8 The top shares become significant at the 10 per cent level, and redistribution becomes significant at the 5 per cent level, but only for the OECD data and only when the level of inequality is excluded as a control variable.

4.3.3 The MRW framework

This article adopts the Mankiw *et al.* (1992) (MRW) framework, to investigate the associations with growth. The MRW design was originally constructed to estimate the rate of income convergence between countries, but is also often used in the inequality to growth literature (e.g., Voitchovsky, 2005; Rooth and Stenberg, 2011). Real GDP growth per person is regressed on the level of real GDP per capita, population growth and the stocks of human and physical capital. Due to convergence, the initial level of income is thought to have a negative effect on subsequent growth. The same holds for population growth, as 'high population growth lowers income per capita because the amounts of both physical and human capital must be spread more thinly over the population' (Mankiw *et al.*, 1992). The stocks of physical and human capital are expected to have positive effects on subsequent economic growth. Yet these last two variables are also channels through which inequality or redistribution might affect growth, as discussed in the theoretical section. Therefore, additional tests are conducted leaving out the stocks of physical and human capital.

The MRW framework can be written in the following way as a fixed effects model, with y_{it} as the level of real GDP per person for country i at time t; x_{it} as the vector of the other control variables; g_{it} as the independent variable of interest, that is, inequality, redistribution or both; and a set of a_i country and η_t period dummies; and idiosyncratic error term u_{it}:

$$\frac{\ln(y_{it+4}) - \ln(y_{it+1})}{3} = \beta_1 \ln(y_{it}) + \gamma \ln(g_{it}) + \ln(x_{it})\beta + u_{it} + a_i + \eta_t$$

To prevent endogeneity problems, economic growth is measured as the difference between the level of GDP per capita at the end of the period and at the beginning of the period plus one year, as the level of GDP per capita at the beginning of the period is already present as an explanatory variable. As five-year periods are taken, excluding the first year, the growth rate is divided by 3 to end up with having an average annual growth rate. For the period 1970-1974 for instance, economic growth is measured as the difference in log GDP per capita between 1974 and 1971, whilst initial level of income is defined as log GDP per capita in 1970. Standard errors are clustered on country level to allow observations within countries to be correlated; the significance of the results does not change when other corrections to the standard errors are made.[9]

9 Results are fully comparable when robust standard errors are used. When panel-corrected standard errors with a general AR(1) error process are employed, the only difference is that the Gini, working-age population, becomes borderline significant at the 10 per cent level and the top 10 per cent income share becomes significant at the 1 per cent level. Results are shown for clustered standard errors. The contemporaneous correlation of standard errors between certain countries cannot be calculated due to too many differences in the periods for which data are available.

Two baseline equations are formulated. When the income distribution indicator refers to the entire population, economic growth, level of income and population growth are also expressed per capita. For the indicators focussing on working-age population, the growth model variables are expressed per working-age person as well. As is common in the growth literature, all variables are expressed in natural logarithm, including the inequality and redistribution indicators. Hence, these coefficients should be interpreted as elasticities. Following Andrews *et al.* (2011), the top income shares are not expressed in logs; the coefficients of the shares should be interpreted as a percentage point change in top share associated with a percentage change in growth.[10]

Economic growth and level of income are expressed as real GDP growth per person, 2005 purchasing power parity (PPP) in US dollars. Population growth is defined as the growth of the total population between 15 and 64 at the beginning of the period. The stock of physical capital is measured as the average annual total gross fixed capital formulation in percentage of real GDP; for the stock of human capital, the average years of total schooling for the total population aged 25 and over is used. All data come from OECD Annual Labour Force Statistics (2012f) and National Accounts (2012g), except for the human capital indicator (Barro and Lee, 2011).

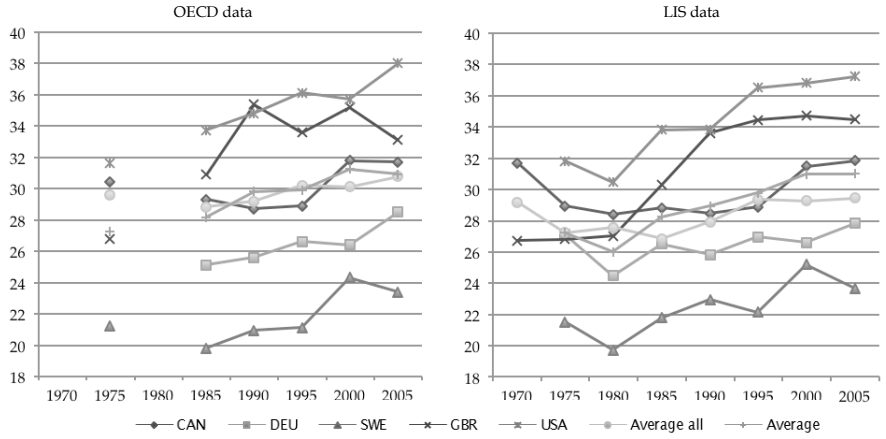
4.4 Empirical analyses

4.4.1 Data description and trends

The data reveal a moderate trend towards increasing disposable income inequality, as graphically displayed in Figure 4.2. The OECD data Gini for the entire population increased on average from 29.6 to 30.8 (from 27.3 to 30.9 for the five countries without any missing values). The LIS data display a comparable rise (from 27.2 to 29.5 and from 27.2 to 31.0 for the five countries without missings). Interestingly, in both data sets France, Greece, Ireland, Spain and Switzerland show a decrease over time for the longest time span available. Slovenia and Estonia, which are only in the LIS data set, and Turkey, only covered by OECD data, also show lower inequality over time. Inequality in Belgium rose according to LIS data whilst it decreased according to OECD data. This probably is a consequence of different coverage; inequality around 2005 is not available for LIS data, which is when Belgium became more equalised according to the OECD data. Denmark became more equal according to LIS, whilst the opposite is true according to the OECD figures, a consequence of a higher inequality estimate in the first year covered (1985) in the LIS data set.

10 The results do not change when the top shares are expressed as natural logarithm (available on request).

Figure 4.2 Gradual and widespread rise in disposable income inequality within the OECD area



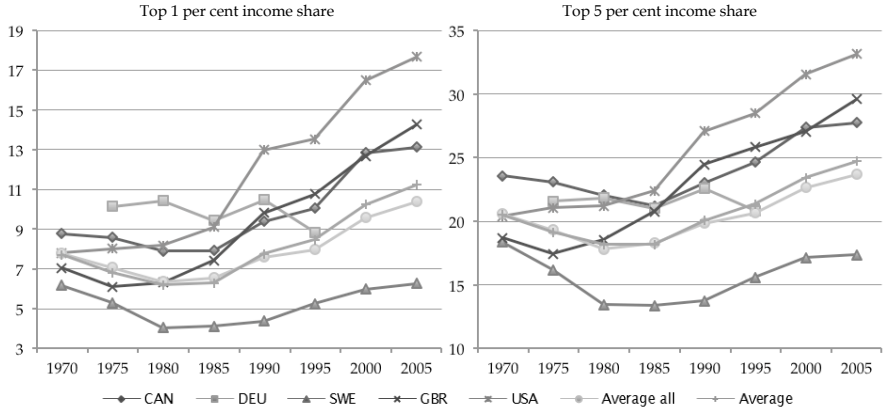
Note Data refer to the Gini, entire population, after taxes and transfers. 'Average all' is the unweighted average for all countries. 'Average' is the unweighted average for the countries without missing observations (CAN, NLD, SWE, GBR, and USA for OECD; and CAN, DEU, SWE, GBR, and USA for LIS)

Source OECD (2011a) and Wang and Caminada (2011)

The data sets indicate that market incomes have grown further apart than disposable incomes. The Gini for the entire population for OECD data increased on average from 39.9 to 47.6 (from 38.8 to 45.6 for the five countries without missing observations), and according to the LIS estimates from 37.8 to 46.4 (from 37.8 to 46.7 for the five countries without missing observations). Australia is the only country for which market income inequality decreased according to the OECD data set, but this is probably due to limit coverage, because the LIS data with a longer time span report an increase in inequality over time. Market income inequality decreased marginally so in Ireland and Estonia, both only covered by LIS data. Results are more contradictory for France, which again might be due to longer coverage by the LIS data.

Figure 4.3 shows that the share of income held by the top 1 per cent increased in all countries for which information up to 2005 is available, except Finland. Yet in Finland, the top share in 2005 was higher than in every other period, apart from the first one in 1970. The three countries for which data are available only up to 1995, Germany, the Netherlands and Switzerland, show a decrease in top income shares. The share of income held by the top 5 per cent shows a comparable pattern. Yet here we see a marginal decrease over the full time period for France and Spain and a larger decrease for Sweden, although again, the income share of the 5 per cent in 2005 was higher in every other period apart from the first one. The top 10 shares are closely in line with the top 5 shares, except from an increased share in Finland and a decrease in Denmark (results not shown here).

Figure 4.3 Enrichment at the top of the income distribution

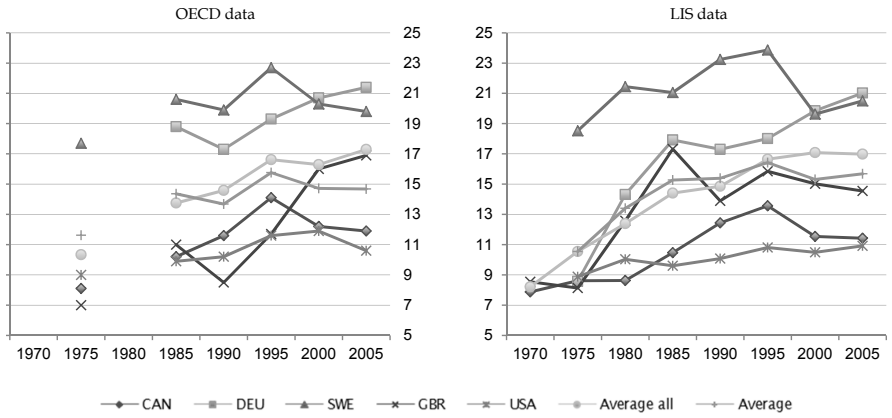


Note Data refer to the pretax top income share. 'Average all' is the unweighted average for all countries. 'Average' is the unweighted average for the countries without missing observations (AUS, CAN, FIN, FRA, JPN, NZL, NOR, SWE, GBR, USA)

Source Alvaredo *et al.* (2012)

The average level of absolute income redistribution has increased over time as shown in Figure 4.4. The OECD data set reports an average increase from 10.3 to 17.3 from 1975 to 2005 (11.6 to 14.7 for the five countries without missing values), whilst the LIS data set displays a rise from 10.5 to 17.0 (10.5 to 15.7 for the five countries without missings). The LIS data set shows increasing redistribution over time in all countries; according to the OECD data, redistribution decreased in Australia, Israel, and the Netherlands, which is probably due to differences in the time span covered.

Figure 4.4 Higher levels of redistribution over time



Note Data refer to the absolute redistribution, entire population. 'Average all' is the unweighted average for all countries. 'Average' is the unweighted average for the countries without missing observations (CAN, NLD, SWE, GBR, and USA for OECD; and CAN, DEU, SWE, GBR, and USA for LIS)
Source OECD (2011a) and Wang and Caminada (2011)

The data sets indicate a moderate positive correlation between market inequality and redistribution, which is in line with the median voter model. Redistribution and disposable income inequality are negatively and stronger correlated. Still, the higher levels of redistribution have not fully compensated the widening of market incomes, as shown by increased inequality in disposable income over time. Both data sets show a positive correlation between the rise of disposable income inequality and redistribution per country over time, indicating that the countries with the sharpest rise in inequality also were the ones with the largest increase in redistribution. Yet this correlation is much higher for the OECD data (0.77) than for LIS (0.17), which is probably due to different coverage of countries and periods.

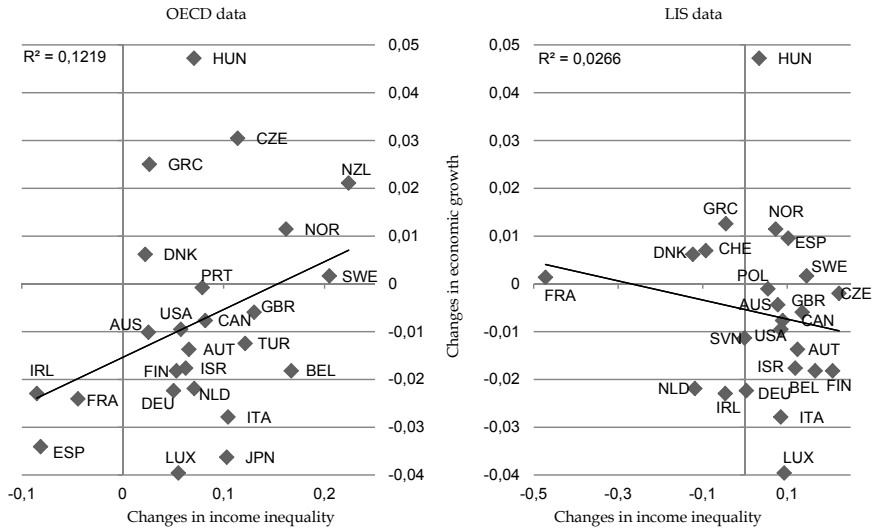
4.4.2 Associations between inequality and growth

Simple associations between changes in income inequality, for both OECD and LIS data, and changes in economic growth summarised in Figure 4.5 reveal an inconclusive pattern because the sign of the association differs per data source.[11] France displays a substantial decrease in inequality for the LIS data,

11 The difference between 2000-2004 and 1985-1989 is used for all scatterplots, because otherwise the crisis from 2008 onwards would disproportionally affect the picture and few data points before 1985 are available.

but this does not affect the trend line. The trend lines have a low R-squared value.

Figure 4.5 Inconclusive associations between trends in inequality and economic growth

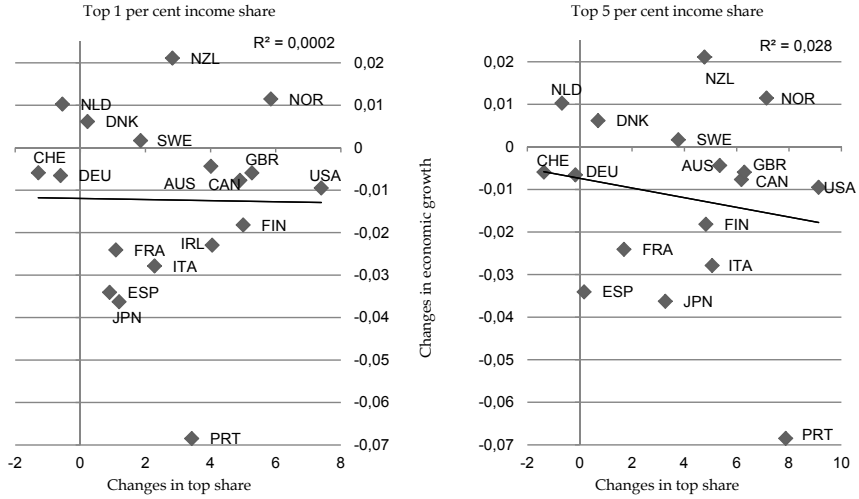


Note Indicators are defined as the log difference in real GDP growth per capita and Gini, entire population, disposable income between 2000 and 1985 (OECD data: CZE, HUN, and PRT 2000 and 1990; AUS 2000 and 1995; TUR 1995 and 1985; LIS data: FRA, HUN, POL, ESP, and CHE 2000 and 1990; GRC and SVN 2000 and 1995; CZE 1995 and 1990)

Source OECD (2011a) and Wang and Caminada (2011)

Also, for the top income shares simple plots do not indicate clear associations over time, as shown in Figure 4.6. For the top 5 per cent income share the association is somewhat clearer, which seems to be due to Portugal showing a more rapid rise in top 5 per cent than in top 1 per cent income shares.

Figure 4.6 No clear associations between trends in top shares and economic growth



Note Indicators are defined as the log difference in real GDP growth per capita and the difference in top shares between 2000 and 1985 (DEU, NLD, and CHE: 1995 and 1985)

Source OECD (2011a) and Wang and Caminada (2011)

Table 4.1 presents fixed effects estimation results in which we control for unobserved heterogeneity and other potential growth determinants. The results consistently indicate that inequality after taxes and transfers does not have a clear association with economic growth. This holds for all inequality indicators with different sensitivity for changes in the distribution and for both the OECD and LIS data. Thus, the results do not support the theories that inequality stimulates growth by inciting people to put forth additional effort or that it negatively affects growth by decreasing the stability. In addition, no systematic evidence is found for positive effects of inequality through the savings channel or negative effects through decreasing the human stock, as the exclusion of respectively the stock of physical capital or stock of human capital do not strongly affect the results.[12] The coefficients of the inequality measures are robust to the exclusion of countries and, by and large, to the exclusion of periods.[13] Also excluding the new EU member states, which might

12 The Gini, working-age population becomes borderline significant at the 10 per cent level, but this loses significance in particular when GRC is excluded (the p value of the inequality coefficient drops to 0.49).

13 The Gini, entire population of the OECD data becomes significant at the 5 per cent level without FIN, but much weaker without GRC, DEU or NOR. For the SCV and MLD, and Gini, entire and working-age population, the coefficient sometimes becomes significant at the 10 per cent level, but this is never in any robust fashion; the results become strongly insignificant without DEU (SCV), NOR (MLD) or GRC (Gini entire and working-age

show different patterns due to their relatively recent economic transitions, does not affect the results in a significant way.[14]

Table 4.1 No clear associations between inequality after taxes and transfers and economic growth

	Baseline	OECD						LIS
		Entire population			Working age population			Entire population
		Gini	SCV	MLD	Gini	SCV	MLD	Gini
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Income inequality		0.029 (0.150)	0.003 (0.286)	0.016 (0.118)	0.031 (0.106)	0.001 (0.450)	0.002 (0.408)	0.010 (0.362)
Level of income	-0.102*** (0.000)	-0.098*** (0.000)	-0.094*** (0.000)	-0.094*** (0.000)	-0.116*** (0.000)	-0.115*** (0.000)	-0.116*** (0.000)	-0.102*** (0.000)
Population growth	0.234 (0.140)	0.226 (0.136)	0.216 (0.311)	0.203 (0.317)	0.275** (0.049)	0.289 (0.190)	0.280 (0.212)	0.224 (0.489)
Physical capital	0.005 (0.749)	0.005 (0.733)	0.004 (0.830)	0.005 (0.751)	-0.002 (0.920)	-0.003 (0.869)	-0.003 (0.863)	-0.000 (0.995)
Human capital	-0.012 (0.225)	-0.005 (0.604)	-0.010 (0.363)	-0.006 (0.532)	-0.010 (0.254)	-0.019* (0.086)	-0.021 (0.115)	-0.010 (0.472)
Constant	0.317*** (0.000)	0.196** (0.018)	0.285*** (0.000)	0.242*** (0.000)	0.318*** (0.002)	0.440*** (0.000)	0.449*** (0.000)	0.294*** (0.008)
N	121	121	107	107	119	105	105	123
Countries	27	27	24	24	27	24	24	25
R^2	0.702	0.707	0.713	0.719	0.716	0.714	0.715	0.683
F-test	47.189***	50.176***	61.658***	65.264***	55.906***	86.948***	78.507***	10.905***

Note Country fixed effects, 1975-2009 for OECD; 1970-2009 for LIS, five year periods with period dummies, clustered standard errors, P values between brackets. Significance levels are noted by *** (1 per cent), ** (5 per cent), or * (10 per cent). All variables in logs. Columns 1-4 and 8: per capita sample. Columns 5-7: working age population sample. All inequality indicators are measured after taxes and transfers

Source OECD (2011a) and Wang and Caminada (2011)

Further evidence that there is no evident relationship between income inequality across the society and economic growth for affluent countries comes from Table 4.2. Here, the Gini before taxes and transfers for entire and working-age population from OECD data and the Gini for primary income for the entire population from LIS data are not robustly associated with economic growth.[15] Thus, these results are not in line with the prediction that inequality before taxes and transfers lowers growth by leading to more redistribution. Leaving out the new EU member states or human capital or investment as explanatory variables does not affect these results.

population). The SCV and MLD for the working-age population and Gini for the LIS data never become significant. A number of inequality indicators become (positively) significant when certain periods are excluded, but the specific period differs per indicator and for other periods, the p values drop substantially.

14 The SCV, entire population, becomes significant when excluding the new member states. Yet this is due to DEU; excluding DEU yields a p value of 0.31.

15 The Gini, entire population of the OECD data never becomes significant. The working-age population version becomes significant without NLD but much weaker (p = 0.66) when GRC is excluded. The LIS Gini, primary income, becomes borderline significant without HUN or IRL, but becomes weaker when POL or GBR are excluded (p > 0.3).

Table 4.2 Indications for positive associations between top income shares and economic growth

	Baseline	OECD Gini before taxes and transfers, entire population	Gini before taxes and transfers, working age population	LIS Gini, primary income, entire population	WTID Top income share 10%	Top income share 5%	Top income share 1%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Income inequality		0.011	0.035	0.023	0.001**	0.002**	0.002**
		(0.718)	(0.186)	(0.161)	(0.047)	(0.030)	(0.019)
Level of income	-0.110***	-0.111***	-0.128***	-0.101***	-0.113***	-0.111***	-0.110***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Population growth	0.310**	0.278	0.258	0.211	-0.163	-0.135	-0.149
	(0.042)	(0.122)	(0.187)	(0.507)	(0.535)	(0.588)	(0.557)
Physical capital	0.004	0.007	0.001	0.001	-0.031	-0.023	-0.018
	(0.820)	(0.742)	(0.943)	(0.966)	(0.106)	(0.180)	(0.210)
Human capital	-0.010	-0.009	-0.019	-0.011	-0.018	-0.011	-0.011
	(0.462)	(0.551)	(0.229)	(0.431)	(0.355)	(0.547)	(0.544)
Constant	0.342***	0.296*	0.348**	0.241*	0.440***	0.404***	0.403***
	(0.000)	(0.086)	(0.041)	(0.051)	(0.000)	(0.000)	(0.000)
N	98	98	96	122	108	112	112
Countries	21	21	21	25	16	16	16
R^2	0.716	0.717	0.722	0.686	0.708	0.711	0.703
F-test	25.12***	30.608***	47.006***	16.595***	27.285***	36.937***	49.095***

Note: Country fixed effects, 1975-2009 for OECD; 1970-2009 for LIS, five year periods with period dummies, clustered standard errors, P values between brackets. Significance levels are noted by *** (1 per cent), ** (5 per cent), or * (10 per cent). All variables in logs, except the top income share variables. Columns 1, 2, 4-7: per capita sample. Column 3: working age population sample

Source: OECD (2011a), Wang and Caminada (2011), and Alvaredo et al. (2012)

Yet the results show an association between growth and the top income shares. This seems to imply that developments at the top end of the distribution have distinctive effects on economic growth. The positive association is in line with the predictions that high rewards can incite people to invest or that a concentration of asset ownership facilitates large investments. It is not in line with the theory that the rich use their wealth to lobby for rent-seeking policies that disrupt growth. Still, the coefficients are small, pointing to a weak relationship. The coefficients for the top 1 and 5 income shares imply that for a given country, a percentage point change in top shares across time is associated with an on average 0.002 per cent higher annual economic growth during that five-year period, holding the control variables constant. Over the total period, for the countries without missing values the top 1 and top 5 income shares increased roughly by 4 percentage points on average. Thus, according to the estimates, we should expect an associated 0.008 per cent higher annual economic growth during that same period. These weak associations are also found by Andrews *et al.* (2011),[16] and they seem to be in line with the observation

16 Their sample slightly differs from ours. We exclude the period 1960-1970 but include FIN, ITA, NOR and PRT as country cases. Also, Andrews *et al.* only use the top 1 per cent and top 10 per cent income shares.

from Kenworthy (2010) that the rise of top shares has not resulted in faster growth or rising incomes for those at the bottom – nor in retarding growth. All in all, the results seem to suggest that the enrichment at the top end of the distribution has not affected growth in any noticeable fashion.

The positive signs are fully robust to the exclusion of countries for the top 5 and top 1 income shares; see also Online Appendix 2 of the *Socio-Economic Review* publication. By and large, this also holds for the exclusion of periods.[17] For the top 10 income share, results become borderline insignificant without Denmark or Portugal, but become significant at the 1 per cent level when we exclude Norway. Leaving out 1980-1984 leads to an insignificant coefficient for the top 10 income share, most likely a consequence of the substantial increase of the top 10 income share in particularly Portugal and the UK during this period.

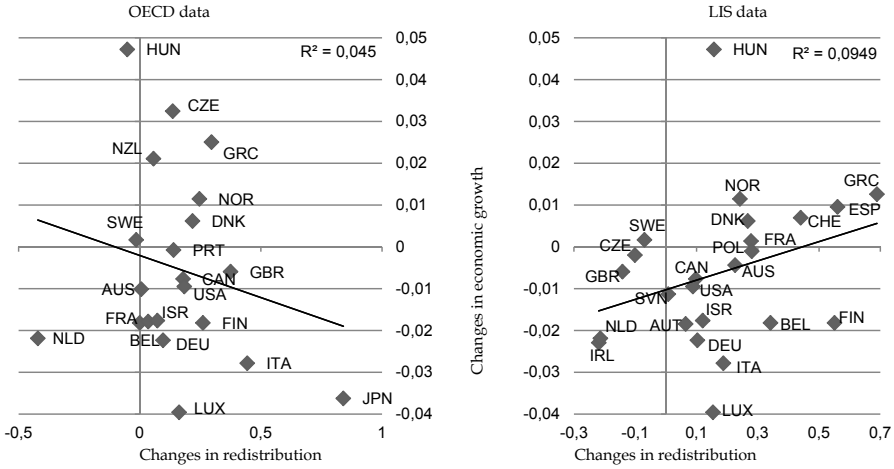
As a further test, we check for nonlinear relations between income inequality and economic growth, as proposed by Banerjee and Duflo (2003, p. 267) to analyse whether changes in inequality in any direction lead to lower growth. We find insignificant coefficients for the Banerjee and Duflo specification (results not shown here) for both OECD and LIS data. It is possible that the (somewhat) larger country sample of Banerjee and Duflo, which includes a number of developing countries, can explain the difference in results of this study and theirs.

4.4.3 Associations between redistribution and growth

Now we address the relationship between income redistribution and economic growth. Simple plots shown in Figure 4.7 do not reveal a uniform picture. The OECD data denote a negative association, whilst a positive one is reported for the LIS data. Again, the R-squared values are low.

17 Leaving out 1980-1984 leads to a borderline insignificant coefficient for the top 5 per cent income share, and the same holds for leaving out 1990-1994 for the top 1 per cent income share (p values of 0.13). Yet without 1975-1979 or 1995-1999 the coefficients become significant again.

Figure 4.7 Inconclusive associations between income redistribution and growth



Note Indicators are defined as the log difference in real GDP growth per capita and absolute redistribution, entire population, between 2000 and 1985 (OECD data: HUN and PRT 2000 and 1990; AUS, CZE, and FRA 2000 and 1995; LIS data: FRA, HUN, POL, ESP, and CHE 2000 and 1990; AUT, GRC, and SVN 2000 and 1995; CZE 1995 and 1990)

Source OECD (2011a) and Wang and Caminada (2011)

The pooled time-series cross-section estimations reported in Table 4.3 do not yield significant associations between redistribution and economic growth for both OECD and LIS data. This does not support the trade-off argument, nor the reasoning that redistribution facilitates growth by providing public insurances that (also) redistribute income. Also the regressions in which we control for the level of inequality after taxes and transfers, in columns (3) and (6), do not yield significant associations for our variables of interest. In fact, the coefficients of the redistribution indicators are hardly affected by the inclusion of the inequality indicator. Hence, the insignificant results of the inequality regressions presented earlier in Table 4.1 were not due to spurious relations because of not taking into account the amount of redistribution. We also cannot conclude that redistribution mitigates effects of inequality.

Table 4.3 Income redistribution does not seem to have a clear association with growth

	OECD Baseline	Absolute redistribution	Absolute redistribution and inequality	LIS Baseline	Absolute redistribution	Absolute redistribution and inequality
	(1)	(2)	(3)	(4)	(5)	(6)
Income redistribution		-0.014	-0.012		0.008	0.008
		(0.131)	(0.276)		(0.413)	(0.390)
Income inequality			0.016			0.011
			(0.474)			(0.339)
Level of income	-0.110***	-0.111***	-0.111***	-0.102***	-0.099***	-0.100***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Population growth	0.310**	0.386**	0.356*	0.220	0.199	0.203
	(0.042)	(0.023)	(0.051)	(0.489)	(0.538)	(0.537)
Physical capital	0.004	-0.006	-0.004	-0.000	-0.000	0.000
	(0.820)	(0.746)	(0.827)	(0.987)	(0.999)	(0.991)
Human capital	-0.010	-0.009	-0.007	-0.011	-0.012	-0.011
	(0.462)	(0.497)	(0.622)	(0.426)	(0.365)	(0.407)
Constant	0.342***	0.404***	0.336**	0.329***	0.307**	0.268**
	(0.000)	(0.000)	(0.025)	(0.003)	(0.011)	(0.026)
N	98	98	98	122	122	122
Countries	21	21	21	25	25	25
R^2	0.716	0.728	0.730	0.681	0.683	0.685
F test	25.118***	24.431***	55.120***	10.680***	15.148***	14.988***

Note Country fixed effects, 1975-2009 for OECD; 1970-2009 for LIS, five year periods with period dummies, clustered standard errors, P values between brackets. Significance levels are noted by *** (1 per cent), ** (5 per cent), or * (10 per cent). All variables in logs. Per capita sample. Income redistribution: absolute redistribution. Income inequality: Gini after taxes and transfers, disposable income

Source OECD (2011a) and Wang and Caminada (2011)

The redistribution coefficients remain insignificant when countries are excluded, when investment or human capital are omitted as explanatory variables, when the new EU member states are left out of the analyses or when periods are excluded.[18] Results also do not change when we use the same set of observations for OECD and LIS data.

4.5 Discussion and conclusion

This study addresses how the socio-economic objectives of attaining growth and restricting income inequality are related to each other. Thus far studies do not simultaneously investigate effects of inequality on growth and redistribution on growth, even though the existing literature provides reasons why the income distribution might affect growth, and also why public re-

18 Excluding GBR yields a borderline significant coefficient for the OECD data regressions without inequality, but the *p* value drops to 0.4 when JPN is excluded. Excluding 2000-2004 leads to a significant coefficient for redistribution based on the OECD data, but it is strongly insignificant without 1985-1989 or 2005-2009 ($p > 0.5$). Leaving out 2005-2009 for the LIS data leads to a borderline significant association for redistribution, but again, this disappears without 1990-1994 or 1995-1999 ($p > 0.8$).

distribution to equalise incomes can influence economic output. Moreover, many studies rely on data that do not properly distinguish between inequality before or after taxes and transfers. A second contribution of this article is that it includes a set of generic inequality measures from two data sources, namely, OECD and LIS data, both before and after taxes and transfers, and it also investigates associations between top income shares and economic growth. Theoretically, the rise of top income shares might alter growth differently than generic inequality across the bottom 99 per cent of the population. The empirical analyses presented here using a pooled time-series cross-section design of 29 OECD countries seem to suggest that there are no clear signs of associations between generic measures of inequality and growth, or redistribution and growth. Yet we find significant positive associations between top shares and economic growth, although the coefficients are small.

The empirical analyses do not provide evidence for theories predicting a positive effect of inequality on growth, through the savings or incentives channel, or for theories suggesting a negative effect of inequality, by affecting stability or the attainment of human capital. This finding corresponds to other studies employing a pooled time-series cross-section design to investigate the effects of inequality on growth (Forbes, 2000; Castelló-Climent, 2004). The finding that top income shares are positively associated with growth might provide some support for the argument that high rewards can incite people to invest or that a concentration of asset ownership could facilitate large investments. Still, the small coefficient corresponds more to the argument that top income shares do not boost growth – nor that they retard it (Kenworthy, 2010).

We also do not find significant associations for redistribution, for both the OECD and LIS data set. Therefore, the results do not support the trade-off theory, as also found for instance by Lindert (2004). The coefficient remains insignificant when the level of income inequality is held constant, thus, it does not seem to be so that any negative (positive) effects of redistribution are cancelled out because of positive (negative) effects of inequality.

It is important to keep in mind that the number of observations is relatively low. Also, the fixed effects estimation employed here assists in controlling for unobserved country differences, but it is known to have low predictive power when variables are highly persistent over time, which is the case for the levels of income inequality and redistribution within affluent countries, although similar results are obtained when random effects or pooled OLS are used. An alternative to increase the number of observations could be to employ a regional design. An extra advantage is that such a design automatically holds constant the redistributing effects of national policies and institutions (e.g., Rooth and Stenberg, 2011).

A second limitation of the design employed here is that the results cannot offer causal evidence due to the possibility of reverse effects of economic growth on inequality and the need and demand for public interference. Future

research could focus on the persistent issue to separate the two causal effects, for instance, by exploiting an exogenous shock in redistribution or inequality, not resulting from a fluctuation in growth or vice versa. Last, this study used an indicator of overall absolute redistribution. An interesting possibility for future research is to compare the effects of different kinds of redistributing instruments on growth, such as means-tested spending, progressive taxing or a minimum wage.

All in all, the question how the socio-economic objectives of attaining economic growth and restricting income inequality are related to each other will continue to be one of the most central questions in political economy. This study has tried to contribute to this debate by describing the importance of taking into account both effects through inequality itself and redistribution on economic growth. In addition, it shows the importance of using high-quality data sources for generic measures of inequality that consistently distinguish between inequality before and after taxes and transfers, but also the use of top income data, as the estimations indicate that enrichment at the top can have different effects on economic growth.