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The empirical relationship between income poverty and income inequality in rich and middle income countries

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Editorial note

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Abstract

This research draws on inequality and poverty statistics from various databases including the European Union Statistics on Incomes and Living Conditions (EU-SILC), the OECD Income Distribution Database (IDD) and the World Wealth and Income Database (WID) to investigate the relationship between inequality and poverty in rich and middle income countries. The analysis is supplemented with detailed case studies for the UK, US, Sweden and Denmark (using in addition distributional statistics from national databases) in order to gain a better understanding of the driving forces behind the correlation between poverty and inequality trends.
Key words: Poverty, inequalities,

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Summary

This research draws on inequality and poverty statistics from various databases including the Eurostat Incomes and Living Conditions database (EU-SILC), the OECD Income Distribution Database (IDD) and the World Wealth and Income Database (WID) to examine the relationship between poverty and inequality in rich and middle income countries.

A number of findings emerge. First, analysis of cross-country differences in the level of poverty and inequality using distributional statistics from the EU-SILC database suggests that there is very strong positive cross-country correlation between levels of poverty and inequality. The estimated correlation is stronger when inequality is measured by the Gini coefficient and the P90:P10 and the P50:P10 ratios by the P90:P50 ratio and when poverty is measured by relative poverty rates than by poverty gaps. Second, evidence from both the EU-SILC and the OECD ID databases shows that the positive correlation between poverty and inequality remains strong (and in most cases statistically significant) when one considers cross-country variation in the changes in inequality and poverty over time although it is weaker than the one identified by exploiting cross-country variations in the levels of poverty and inequality. Third, analysis of the long term trends in the top 1 and top 10 per cent income shares inequality using data from the World Wealth and Income database and relative poverty risk statistics from the OECD database shows no consistent pattern in how these statistics track each other, suggesting that the forces that drive the evolution of top income inequality and poverty are different. Fourth, results from extended regression models which exploit cross-country, cross-time variation in the relationship between changes in relative poverty risk and changes in inequality suggest that the positive correlation between the two statistics remains strong and statistically significant even when controlling for the initial level of inequality, initial average household income and income growth. Moreover, the results from these models show that none of these three variables has any significant impact on the change in the relative poverty risk once we account for inequality growth. On the other hand, both the initial levels of inequality and the initial level of income have significant positive effects on the change in the anchored poverty risk, implying that anchored poverty risk falls by less in economies with higher levels of initial inequality and with higher initial average household income. When controls for average household income growth are included in the anchored poverty risk equation, the coefficient of the initial level of inequality variable falls and turns statistically insignificant implying a negative correlation between income growth and initial level of inequality (i.e. income grows less in countries with higher levels of inequality). Consistent with expectations the

coefficient on the income growth variables suggest that anchored poverty risk falls by more with higher income growth.

Overall, despite the positive cross-country correlation between changes in poverty and inequality, the analysis also identified the varying experiences of countries in how inequality and poverty evolved. This heterogeneity indicates that it may not be appropriate to reach to broad brush conclusions concerning the relationship between poverty and inequality from cross-country analyses and highlights the importance of policies and institutions in shaping the various distributional outcomes in each society. The fact that cross-country correlations between levels of poverty and inequality are stronger than cross-country correlations between changes in poverty and inequality also points out that there is certain degree of persistence in poverty and inequality developments which themselves may be down to idiosyncratic country-specific factors. To better understand these forces, in the final stage the analysis we looked in detail at the evolution of poverty and inequality in four countries (i.e. the UK, US, Sweden and Denmark) to examine more closely how the structure and the developments in labour markets, tax and welfare systems shape the relationship between poverty and inequality growth in different countries.

1. Introduction

As it has been widely documented, over the last 30-40 years income inequality has reached historically high levels in most OECD countries and is still rising (OECD, 2015). Increasing inequality (and especially increased concentration at the top) is seen to be the key cause of stagnating or even falling living standards for people at the middle and lower parts of the distribution. The view that the gains from economic growth have not been shared evenly in advanced economies has been at the heart of the recent focus on 'inclusive growth' and 'shared prosperity' among various multilateral organisations including the OECD and the World Bank who see rising inequality to represent a threat to social cohesion but also an economic concern with detrimental effects on long term economic growth, poverty and social mobility (OECD, 2015; World Bank, 2014; Stiglitz, 2012; Stiglitz, 2015; Stiglitz, 2016).[1] These are some of the reasons why the notion of 'inclusive growth' as a means of attaining sustained equitable distribution of the benefits of growth for advanced economies and how this can in turn drive further growth by lifting up the lower end of the income distribution is gaining prominence.

This paper uses data from various databases that provide comparative distributional statistics for rich and middle income countries over time to examine the relationship between poverty and inequality. In particular we draw on distributional statistics from the European Union Statistics on Incomes and Living Conditions (EU-SILC), the OECD Income Distribution Database and the World Wealth and Income Database (WID)[2] to examine first, the degree of cross-country correlation between levels of poverty and levels of inequality and secondly the cross-country correlation between changes in poverty and changes in inequality. In addition to estimating the strength of the association between changes in the poverty and inequality the aim of the latter analysis is to investigate how income inequality and poverty evolved over time, and to investigate the extent to which rising inequality has been associated with increasing poverty and

[1] The concept of *inclusive growth* deals with the idea that economic growth is important but not sufficient to generate sustained improvements in welfare, unless the dividends of growth are shared fairly among individuals and social groups (OECD, 2014). Inclusive growth is a concept that advances equitable opportunities for economic participants during economic growth with benefits incurred by every section of society. The definition of inclusive growth implies direct links between the macroeconomic and microeconomic determinants of the economy and economic growth.

[2] The three databases are accessible respectively from: http://ec.europa.eu/eurostat/web/income-and-living-conditions/data/database, https://stats.oecd.org/Index.aspx?DataSetCode=IDD, and www.wid.world.

stagnating living standards among people in the lower parts of the distribution. We supplement our analysis with detailed case studies for the UK, US, Sweden and Denmark (using for the case of the UK and US additional distributional statistics from national databases) in order to gain a better understanding of the driving forces behind the correlation between poverty and inequality trends. Unlike much of the previous literature which has mainly focused on developing countries, or on the two-way relationship between growth and inequality, or growth and poverty the main aim in this paper is to understand the extent to which the long-term trends in income poverty in developed economies tracks those in income inequality.

Section 2 discusses briefly the concepts of poverty and inequality and the way by which these are linked technically. Section 3 describes the data and the various concepts of poverty and inequality used in the analysis while section 4 and 5 present the results of our analysis. A number of findings emerge. First, analysis of cross-country differences in the level of poverty and inequality using data from the Eurostat Income and Living Conditions database, in sections 4.1 and 4.2, suggests that there is very strong positive cross-country correlation between levels of poverty and inequality especially when inequality is measured by measures that take into account the income dispersion between the bottom and the rest of the distribution and when poverty is measured in terms of poverty rates than in terms of poverty gaps. Second, the positive correlation between changes in poverty and inequality remains strong (and in most cases statistically significant) when one considers changes in inequality and poverty across countries over time although it is weaker than the one identified exploiting cross-country variations in the levels of poverty and inequality. Third, the analysis in section 4.3 which looks at the long term trends in the top 1 per cent income share inequality using data from the World Wealth and Income database and relative poverty rates statistics from the OECD database shows no consistent pattern in how these statistics track each other, suggesting that the forces that drive the evolution of top income inequality and poverty are different. Fourth, in section 4.4 results from extended regression models estimating the relationship between changes in poverty and changes in inequality suggest that the positive correlation between the two statistics remains strong and statistically significant even when controls for the initial level of inequality, initial income and income growth are included in the models and that none of these three controls has any significant impact on the change in the relative poverty risk once we account for inequality growth. On the other hand, both the initial levels of inequality and the initial level of income have significant effects on the change in the anchored poverty risk. The coefficients from these models imply that anchored poverty risk falls by less in economies with higher

levels of initial inequality and with higher levels of initial income. When controls for income growth are included in the anchored poverty risk equation, the coefficient of the initial level of inequality variable falls and turns statistically insignificant implying a negative correlation between income growth and initial level of inequality (i.e. income grows less in countries with higher level of inequality). Consistent with expectations the coefficient on the income growth variables suggest that anchored poverty risk falls more with higher income growth. Overall, the analysis also identified the varying experiences across countries in how inequality and poverty evolved over time and although in the majority of countries and sub-periods rising inequality was accompanied with rising poverty there were countries and sub-periods where inequality increased but poverty decreased (and vice versa). This heterogeneity indicates that it may not be appropriate to reach to broad brush conclusions from these types of analyses and highlights the importance of policies and institutions (e.g. welfare state, labour markets, and family systems etc.) in shaping the income distribution and the distributional outcomes for the lower parts of the population. So in the final section of the paper I looked in detail at the evolution of poverty and inequality in four countries including the US, the UK, Sweden and Denmark in order to relate poverty and inequality trends to the specific labour market and social policy developments in each of these countries. This analysis also serves as robustness check of our cross-country analysis findings which is particularly important given concerns about the comparability of international distributional statistics (see Atkinson and Brandolini, 2001).

2. The link between inequality, poverty and growth

Poverty and inequality although theoretically distinct concepts (Atkinson, 1987) are very closely linked as they summarise different aspects of the same phenomenon i.e. a distribution. Inequality considers the entire spread of a distribution[3] whereas poverty mainly focus on the lower part of the distribution and is mainly concerned with identifying the poor and summarising this into an indicator that show levels of poverty in a society (Foster et al., 2013). For more details about the poverty and inequality concepts and measurement the reader is referred to another paper in the series Yang, (2017a).

A critical issue in poverty and inequality measurement is how inequality-neutral and poverty-neutral changes are defined. Under a relative notion of inequality, inequality is deemed to be unaffected if all incomes change by the same proportionate amount ('scale invariant' axiom) whereas under an absolute notion of inequality, inequality is unaffected if all incomes increase or decrease by the same absolute amount ('translation invariant' axiom). Analogously a relative poverty measure satisfies the 'scale invariance' axiom (which requires poverty to be unaffected if the poverty line and all incomes of the poor change by the same *proportionate* amount) whereas an absolute poverty measure satisfies the translation invariance axiom (which requires poverty to be unaffected if the poverty line and all incomes of the poor change by the same *absolute* amount). In most parts of the literature however absolute and relative poverty is taken to refer to whether the poverty is measured adopting a relative or an absolute poverty line. Absolute poverty lines are fixed cut-off points applied across all potential income distributions under consideration, whereas relative poverty lines are defined in relation to the distribution of a given population at a given point in time. As stressed by Förster and Vleminckx (2004) despite what their name suggest 'absolute' poverty lines vary significantly by the economic performance of the country being considered (e.g. the World Bank uses $1, $2 or $3 per person per day thresholds while the US applies a $11 per person per day threshold). Note that it is also possible to define poverty as some combination of the absolute and relative definition (see Foster, 1998; Atkinson and Bourgignon, 2000; and Ravallion, 2003).

[3] The most commonly used inequality statistic is the Gini coefficient, but a number of other measures have been applied to a wide range of countries including the percentile ratios (P90:P50, P90:P10 and the P50:P10 ratios), the quintile shares (S80:S20), the Palma Index and the various Atkinson indices - for overviews of the various inequality indices see among others: Allison, 1978; Cowell, 2000; and Heshmati, 2004.

As the discussion above indicates, there is a technical link between poverty and inequality. For a given level of income, small changes in the income distribution (or the level of inequality) can have large effects on reducing absolute poverty (both the extent of poverty but also the depth and the severity of poverty). Conversely, (and as has been demonstrated by a number of studies in the international development literature), for a given level of inequality, growth is a mathematical condition for poverty reduction (Bourguignon, 2004; Deininger and Squire, 1997; Dollar and Kraay, 2001). Regarding this issue it should be stressed, however, that when referring to poverty, most studies in the international development literature refer to an absolute notion of poverty (poverty measured against a fixed cut-off). When poverty is measured in relative terms, it is still likely that increases in dispersion of income lead to corresponding increases in poverty. However, it is also equally likely that poverty may not follow changes in the income inequality if all the action takes place above the median (which is the typically used poverty threshold). Conversely, poverty could increase without inequality increasing if median incomes increased while top incomes reduced (and vice versa). Indeed as Bourguignon (2004) notes "…a relative definition of poverty – sometimes referred to as 'relative deprivation' – becomes in some sense independent of growth. The absolute level of income and therefore a large part of the development process does not matter anymore with such definition. Only relative income, or pure distributional features matter. Fixing the poverty line relative to average incomes can show rising inequality even when the standards of living of the poor have in fact risen. There is an increasing consensus among economists that relative deprivation matters, but there does not appear to be a consensus that individual welfare depends only on one's relative position and not at all on absolute standards of living as determined by incomes."

Despite the lack of consensus in the literature on how to define and measure individual welfare, there is little doubt, that for a given rate of growth, the initial level of inequality and how the pattern of growth changes inequality over time can determine the effectiveness (or ineffectiveness) of (absolute) poverty reduction strategies and policies (Bourguignon, 2004). For many years the dominant view in the economic and political debates was that higher levels of inequality provide the incentives that drive economic growth (Lazear and Rosen, 1981) and raise savings and investment (Kaldor, 1957) which in turn will accrue benefits for the middle and lower parts of the distribution through higher real incomes. More recently, however there has been a shift away from this thinking and towards the position that inequality is detrimental to economic growth and the real income of people in the middle and lower parts of the income distribution. Moreover, cross-country empirical studies suggested that

growth had no significant effect on reducing inequality. Similarly over time more and more people share the view that more equitable income and wealth distribution increases growth while inequality has detrimental effects for growth. As discussed by Thewissen et al., (2015), the channels through which such detrimental effects may arise have been identified as fuelling household debt and real estate bubbles; reduction of aggregate demand (since rich spend less) and capital investment; constraints in the capacity of middle and low income households to invest in education and skills; entrenching the power of existing elites to protect their economic interests. Yang (2017 b, c, d) reviews various mechanisms linking economic inequality and poverty both directly but also indirectly through the impact of inequality on growth.

3. Data and concepts

Various perspectives can be used to evaluate the distribution of living standards in a society, including monetary indicators (such as expenditures, income and wealth) as well as non-monetary indicators such as multidimensional measures of living standards, happiness, life satisfaction as well as functioning and capabilities.[4] In this paper we use income as our reference variable to measure the standard of living but we stress that poverty and inequality may involve several dimensions. Yang and Vizard (2017b) examine the relationship between income inequality and multi-dimensional poverty measures.

In both the OECD and the Eurostat databases the unit of analysis is the individual while main income measure is total household disposable income in a particular year.[5] As discussed by Jarvis and Micklewright (1995) the underlying reason for using the individual as the unit of analysis - which also align with the recommendations put forward in Atkinson et al. (2002) - is that each individual in society should be treated as "equal citizen" in the distribution. The income of the household is attributed to each of its members, with an equivalisation adjustment to reflect differences in needs and economies of scales for households of different sizes and composition. Despite small differences both across countries and within countries over time the income measures in the two databases are in principle the same, consisting of earnings, self-employment and capital income and public cash transfers; income taxes and social security contributions paid by households are deducted. In contrast to the OECD and Eurostat databases the income concept in the World Wealth and Income Database is taxable income (while the unit of analysis is either the tax filling units or families). Though this income concept is rather incomplete in its population coverage it has the advantage that it permits more accurate and long run investigations of the top incomes shares (see Morrelli et al., 2014: 2).

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4 As an example of multi-dimensional approaches to the measurement of poverty note the Global Multi- Dimensional Poverty Index (Alkire et al., 2014). The Equality Measurement Framework proposed by Burchardt and Vizard (2011) offer a multi-dimensional approach to monitor inequalities in the position of individuals and groups in terms of their substantive freedoms.

5 In most household surveys underlying the statistics published in Eurostat Income and Living Conditions and the OECD Income Distribution databases household is defined either as an individual or a group of individuals who live together under the same housing arrangement and who combine to provide themselves with food and possibly other essentials of living. Although there are small differences both across countries and within countries over time the income measure in the two databases is in principle the same

The measures used in the paper to characterise inequality developments include the Gini coefficient, the P90:P10, the P90:P50 and the P50:P10 ratios.[6] Each of these measures has a varying degree of sensitivity to distributional changes at different parts of the distribution. The Gini coefficient, which is perhaps the most widely used inequality measure, is very sensitive to changes that occur around the mode of the distribution and less sensitive to changes that occur at the tails. Simultaneous changes in different directions at the top and bottom of the distribution can result in a net effect of zero on the Gini coefficient (Förster and Vleminckx, 2004). Additionally, small distributional changes at the bottom may not affect the Gini coefficient whereas they may have a large effect on poverty (Naschold, 2002). The P90:P10 ratio which as its name suggests is the ratio of the 90th percentile of the distribution to the 10th percentile capture the degree of dispersion but does not capture changes occurring at either the tails or the middle of the distribution. Analogously the P90:P50 ratio represents the 90th percentile of the distribution as a multiple of 50th percentile of the distribution and the P50:P10 ratio represents the 50th percentile of the distribution as a multiple of 10th percentile. In addition to the above measures we use the top 10 and the top 1 per cent income shares from the World Wealth and Income database to capture inequality at the top of the distribution. As their names suggest, the top 10 and the top 1 per cent income shares capture the share of income received by the top 10 and 1 per cent of the distribution. While this is far from an exhaustive list of inequality measures, together they capture the evolution in relative income dispersion across the distribution.

As with inequality various indicators are used to characterise poverty developments. The central measure is the *relative poverty risk*. This indicates the per cent of people with equivalised household income below 60 per cent of the contemporary median equivalised household income in each country and year. Though relative poverty risk as an indicator, allows us to see how the living standards of the poor change relative to median changes in living standards, relative poverty lines vary with the standard of living and as such relative poverty risk is often criticised that it constitutes an inequality indicator and as such follows movements in relative inequality (Förster and Vleminckx, 2004). As stressed in OECD (2013) with relative poverty lines the analysis of changes in poverty over time and space is complicated by the fact that there are two sources of change: the direct impact of the change in the distribution and the indirect

[6] A number of other inequality indices have been discussed in the literature including the Atkinson Index, have other useful properties, but data availability and more crucially space limitations mean that they are not examined here. For overviews of the various inequality indices see Yang, 2017; Allison, 1978; Cowell, 2000; Heshmati, 2004.)

impact through the change in the underlying living standard, such as growth in median income. In addition to the relative poverty risk, we use an anchored poverty risk indicator. Anchored poverty risk indicators are calculated by fixing the poverty line at a point in time and then frozen and used as an absolute threshold over time. Poverty indicators based on anchored poverty lines capture changes in poverty keeping the indirect effect in the evolution in living standards constant. As stressed in OECD (2013) however "…It remains problematic however how to interpret the meaning of an unchanging relative poverty line as the notion of relative poverty aims to capture social inclusion, a concept which embodies intrinsically an important time varying component". In the Eurostat database there are three anchored poverty risk indicators: one calculated using the 1998 poverty line as a poverty threshold (available from 1998 to 2001), another based on the 2005 poverty line threshold (available from 2005 onwards) and finally one using the 2008 poverty threshold (available from 2008 onwards). In addition to the above described poverty risk indicators, the Eurostat database includes statistics on the *mean poverty gap* ratio indicators (i.e. the income gap of the poor expressed as a proportion of the poverty line), calculated as the difference between the poverty threshold and the mean disposable income of the poor, expressed as a percentage of the poverty line (calculated using the relative poverty threshold). Together these indicators allow us to examine the evolution of both the breadth and depth of poverty and its relationship with inequality trends.

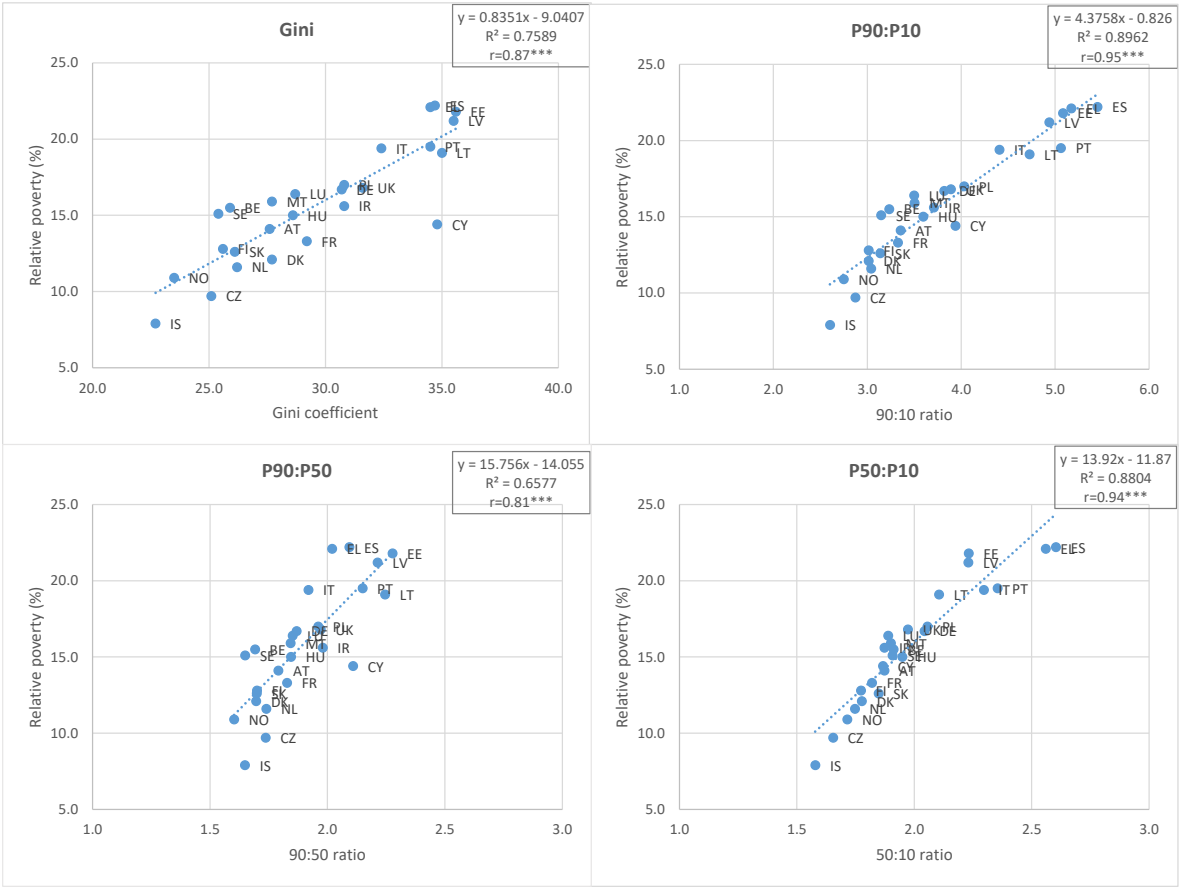
4. The empirical relationship between poverty and inequality

4.1 Inequality and poverty: Evidence from the Eurostat Income and Living Conditions Database

This section examines the empirical relationship between poverty and inequality across a number of European countries utilising published statistics from the Eurostat Income and Living Conditions database. The analysis first considers the strength of the association between poverty and inequality by exploiting cross-country correlation between levels of poverty and inequality and then moves on to examine the dynamics of the relationship examining the cross-country correlation between changes in poverty and changes in inequality and identifying for which countries the relationship appears to be weaker or diverge.

Figure 1 plots the relationship between levels of (relative) poverty risk and inequality for different European countries in 2014 according to different inequality measures. Overall, both the fitted regression lines and the correlation coefficients (reported along with the R^2 and the regression coefficients in text boxes in each graph), levels of inequality and poverty tend to be highly correlated, implying that countries with higher levels of inequality tend to have higher relative poverty risk and vice versa. The relationship between poverty and inequality is stronger in terms of inequality measures that capture the degree of dispersion at below median income levels (i.e. the P50:P10 and the P90:P10 ratios) and weaker in terms of measures that capture dispersion at above median income levels (e.g. the P90:P50). In 2014, the correlation between poverty and inequality based on the Gini coefficient is around 0.89, whereas based on the P90:P10, P50:P10 and P90:P50 ratios 0.94, 0.97 and 0.81 respectively.

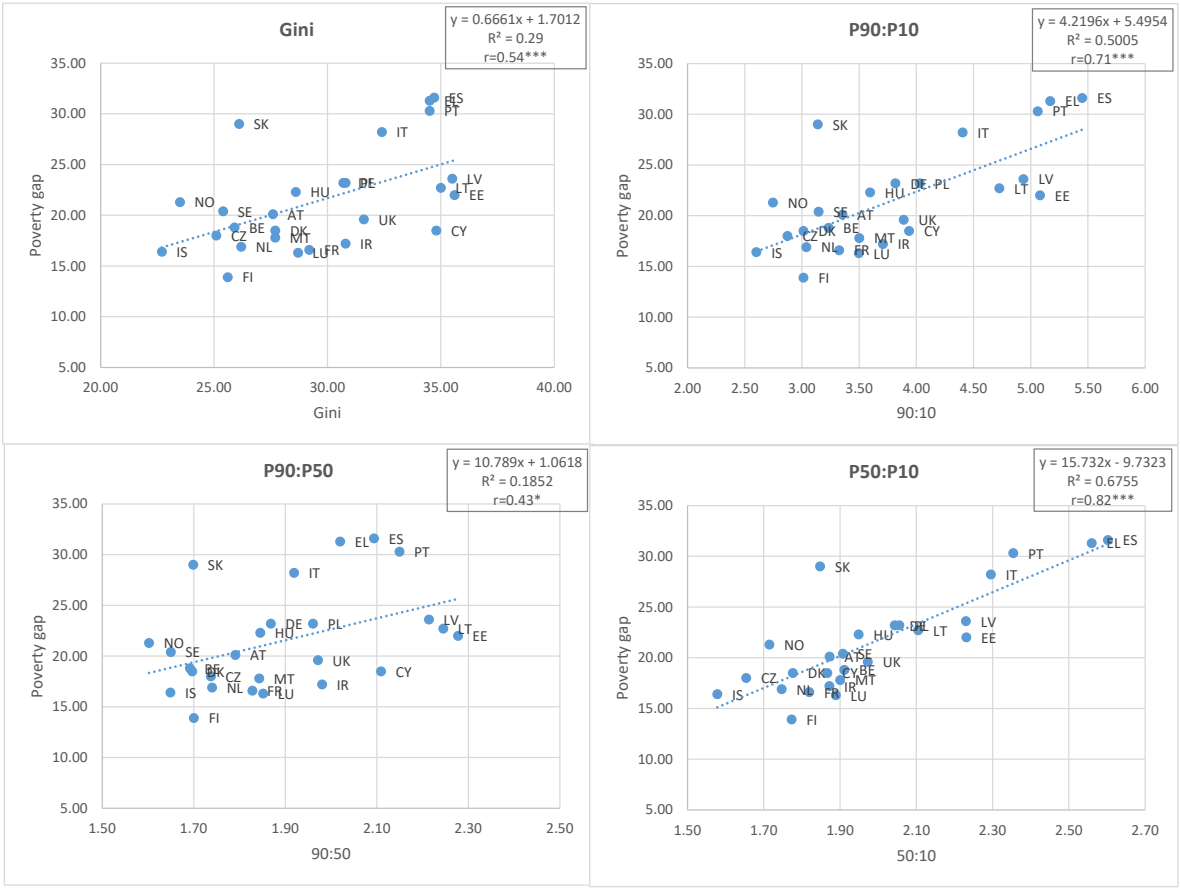
Figure 1: The cross-sectional relationship between levels of relative poverty risk and levels of inequality in 2014 across European countries according to different inequality measures



Note: Author's calculations based on statistics from EU-SILC as published in EUROSTAT database. The sample this graph includes 26 countries (these are all countries with published statistics for all years from 2005 to 2014).

Figure 2 considers the relationship between inequality (again in terms of various inequality indices) and the depth of poverty as measured by the mean poverty gap ratio (defined as the average poverty gap in the population as a proportion of the poverty line). As discussed in section 2, unlike the relative poverty risk which simply counts all the people below a poverty line, in a given population, and considers them equally poor the poverty gap ratio takes into account the depth of poverty. Similarly with the relative poverty risk, the mean poverty gap ratio exhibits a very strong correlation with inequality. Again, the correlation is stronger when inequality is measured in terms of the P90:P10 and the P50:P10 ratios (as one would expect since both these inequality measures take into account the level of dispersion at the bottom of the distribution) and weaker in terms of the P90:P50 ratio and the Gini coefficient. For all inequality measures, however, the correlation with the poverty gap ratio is weaker than for the relative poverty risk suggesting that there is more heterogeneity in the relationship between inequality and the depth than in the breadth of poverty.

Figure 2: The cross-sectional relationship between levels of poverty gap and inequality in 2014 across European countries according to different inequality measures.



Note: Author's calculations based on statistics from EU-SILC as published in EUROSTAT database. The sample this graph includes 26 countries (these are all countries with published statistics for all years from 2005 to 2014).

Another way of looking at the relationship between poverty and inequality is to examine inequality and poverty within countries over time. Figure 3 plots the relationship between per cent changes in relative poverty risk and per cent changes in inequality (measured by Gini and the percentile ratios) for a number of European countries over two time periods, i.e. comparing 2001 with 1996/97 and comparing 2014 with 2005. A total of 14 countries have data for the 1996/97-2001 time period and 26 countries for the 2005-2014 time period. It should be stressed that the underlying data source of the statistics in the Eurostat Income and Living Conditions database is the European Community Household Panel Survey for the earlier time period and the EU Statistics on Income and Living Conditions (EU-SILC) for the second time period. As will be discussed below, this change in the underlying data sources makes the comparison of the relationship across the two time periods difficult.

The superimposed regression lines in each of the graphs, which represent the estimated linear relationship between poverty and inequality changes, in the two time periods instantly suggest that there is a positive correlation between the two statistics in both time periods for most inequality measures. However, it is also immediately clear that the relationship in terms of all inequality measures is substantially weaker than the one estimated between levels of poverty and levels of inequality. This finding suggests that there is much more heterogeneity in poverty and inequality trends than in the level of poverty and inequality across countries. Nevertheless, the two statistics are still highly (and statistically significantly) correlated in terms of most inequality indices (with the exception the P90:P50 ratio which has a small and insignificant coefficient in both time periods) and especially when inequality is measured in terms of the P90:P10 and the P50:P10 ratios (i.e. the inequality measures that capture the dispersion between the top and bottom and the mid and the bottom of the distribution). It should be stressed here that the weaker correlation between poverty and the P90:P50 ratio inequality is an artefact of the relative definition of income poverty (as much as the stronger correlation between relative poverty and the P50:P10 ratio) and may reflect a mechanical link between the two statistics operated through the median. Consider for example a rise in the P90:P50 ratio inequality as a result of a decrease in the median income levels. Such a rise in P90:P50 ratio may be accompanied by decreasing relative poverty if income levels below the median increase (or decrease proportionately less than the median).

Conversely falling P90:P50 ratio inequality may be accompanied by rising relative poverty risk as long as the relative increases at the median are proportionately larger than the relative increases in income levels at lower income deciles.

In the period 1996-01 both inequality and the relative poverty risk fell in the majority of countries and in the large majority of countries, inequality and poverty moved in the same direction (although not to the same extent). There are however a few notable exceptions. In Ireland, over this period there has been a decrease in inequality in terms of the Gini coefficient and the P90:P50 ratio and an increase in the relative poverty risk (which in turn reflected the increase in inequality at the bottom of the distribution as shown by the increase in the P50:P10 ratio and in the P90:P10 ratio). In the UK inequality increased in terms of the Gini but fell in terms of P90:P50 and the P90:P10 ratios while the relative poverty risk remained unchanged.

In contrast to the changes that occurred in 1996-01, in the period 2005-14 rising inequality (and specially increased dispersion between the bottom and the top end of the distribution) was the dominant inequality trend across Europe: the Gini coefficient inequality increased in 46 per cent of countries, the P90:P10 ratio inequality in 73 per cent of the countries, while the P90:P50 and the P50:P10 ratio inequality increased in 65 per cent of the countries. In the large majority of countries rising inequality was accompanied by rising relative poverty risk (these countries are located in the upper right hand quadrant of each graph). The pattern is stronger when inequality is measured in terms of the Gini coefficient and the P50:P10 ratio and weaker in terms of the P90:P50 ratio: poverty increased in 91 and 95 per cent of countries with rising Gini and P50:P10 inequality whereas it increased in 70 per cent of countries with rising P90:P50 ratio inequality. Overall, however, it is clear that there is quite a large degree of variation in the magnitude of the change in the two statistics and even countries where relative risk fell while inequality increased (e.g. Cyprus). Conversely, in the large majority of countries where inequality decreased the dominant poverty trend was a decrease in the relative poverty risk (these are depicted in the bottom left hand quadrant which is the next most populated quadrant). In a couple of countries, however, falling inequality was accompanied by increased relative poverty risk (Belgium, Netherlands, Portugal and Italy).

Attempting a comparison of the 1996/97-01 and the 2005-14 time periods one can note that the relationship between relative poverty risk and inequality changes strengthened over time when inequality is measured in terms of the P90:P50 ratio and P50:P10 ratios whereas it weakened in

terms of the P90:P10 ratio and the Gini coefficient. The differences in the way that the patterns of poverty change are related to inequality changes in the two periods suggest that poverty changes that occurred between the mid-1990s and the early-2000s were more strongly linked to distributional changes that occurred at the middle and upper part of the distribution whereas between 2005 and 2014 poverty changes were more strongly linked to changes in the income dispersion at below median income levels. While the results above imply that the correlation between poverty and inequality have strengthened over time (i.e. between 1996/97-2001 and 2005-14) it is worth stressing that the estimated relationships in the two time periods are based on a different sample of countries. Sensitivity analyses restricting the sample to the countries that had non-missing poverty and inequality statistics in both time periods suggest a similar relationship. Although this is reassuring, concerns about the comparability of the estimates across the two time periods still remain because the statistics are based on different underlying data (i.e. the ECHP in the early period and EU-SILC in the later time period).

Figure 4 depicts the relationship between changes in inequality and changes in the depth of poverty. Similarly to the cross-sectional patterns, the relationship between changes in inequality and changes in poverty gaps is substantially weaker than the relationship between changes in inequality and changes in the relative poverty risk. This suggests that there is more heterogeneity in the way that the distributional changes that took place in most countries over this period affected the depth of poverty than the extent of poverty. An inspection of appendix Figure A3 makes this immediately clear. Despite the fact that the change in the relative poverty risk is positively correlated with changes in the poverty gap for the majority of countries there is a substantial variation in the magnitude of change in the two statistics: see especially Sweden and less so Germany on the one hand (very large increases in the relative poverty risk and more moderate increases in the poverty gap), and Greece and Austria on the other (large increase in poverty gaps and more moderate increase in poverty risk). Despite the weaker correlation between the growth in inequality and the poverty gaps, again in the majority of countries where inequality increased the poverty gaps also increased. As it was the case in terms of the poverty risk, the pattern is stronger when inequality is measured in terms of the P90:P10 and the P50:P10 ratios whereas it is considerably weaker in terms of the P90:P50 ratio.

Finally, Figure 5 plots the relationship between per cent changes in anchored poverty risk and per cent changes in inequality over two time periods, i.e. comparing 2001 with 1998 and comparing 2014 with 2005. A

number of interesting findings emerge from this analysis. First, measures based on anchored and relative poverty lines lead to quite different results regarding both the level and the direction of the poverty change. In particular, unlike the relative poverty measures presented in the previous two figures, in terms of the anchored poverty risk measure falling poverty was the dominant poverty trend over the period between 2005 and 2014. In 18 out of the 26 countries with available data (or 72 per cent of all countries) the anchored poverty risk points to a decrease in poverty compared to 9 countries in terms of the relative poverty risk measure. In the majority of countries with rising inequality the anchored poverty risk either increased (for example Greece, Germany, Luxemburg) or decreased by less than in countries where inequality fell (for example Denmark, Sweden, Austria and Hungary). The pattern is stronger when inequality is measured in terms of the P90:P10 ratio and the P50:P10 ratio. On the other hand, in the majority of countries where inequality fell there has been a substantial decrease in the anchored poverty risk (most notable are the cases of Poland and Norway but also Czech Republic, the UK, Belgium and the Netherlands). It should be noted however, that in the majority of these countries decreasing anchored poverty risk was accompanied by an increase in the relative poverty risk. Belgium and Netherland are two exceptions. In both these countries, the risk of poverty using the anchored poverty line decreased, reflecting the rise with respect to previous income levels but as median income increased more than the incomes in the bottom of the distribution, the poverty risk using a relative poverty line increased (by 5 per cent in Belgium and 8 per cent in the Netherlands).

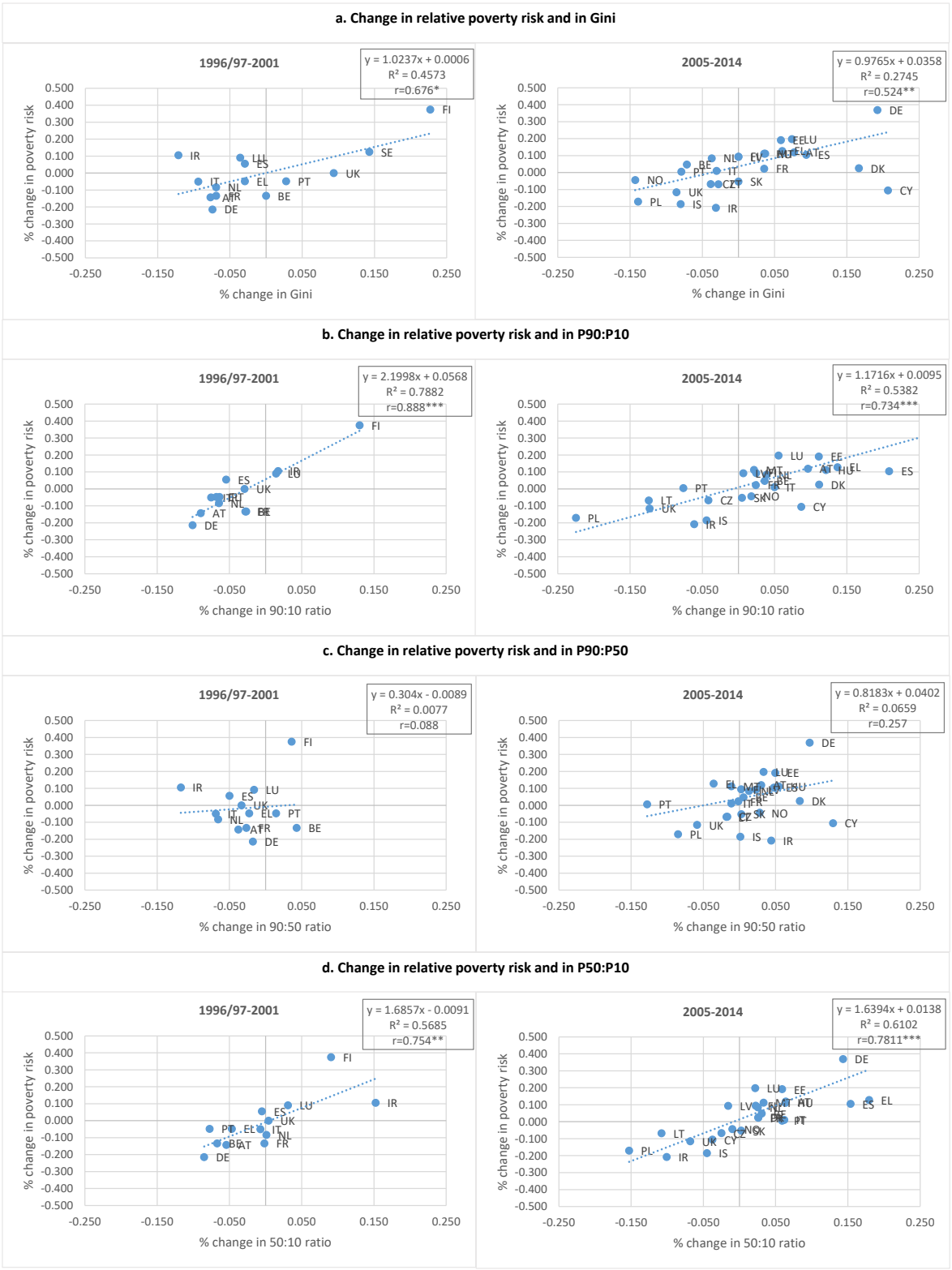
Overall, both the fitted regression line and the correlation coefficients (reported again along the regression coefficient and the R^2 in the text boxes in each graph) show that there is statistically significant positive correlation between the growth in the anchored poverty risk and the growth in inequality in the 2005-14 time period. The correlation between the two statistics again was stronger in terms of the P90:P10 and P50:P10 ratios than in terms of either the Gini or the P90:P50 ratio. Though the relationship is weaker than when using a relative poverty threshold (especially in terms of Gini) it is still significant in terms of most inequality indices (except from the P90:P50 ratio). Though it is difficult to make comparisons across the two time periods, it is interesting to note that in the period 1996-01, growth in the anchored poverty risk has a (very low) negative correlation with the growth in inequality in terms of all inequality measures.

To examine the possibility that the relationship between poverty and inequality may have weakened during the Great Recession we break down

the 2005-2014 time period into the pre-recession, the recession and the post-recession time periods (represented respectively by the 2005-08, 2008-12 and 2012-14 time periods). This analysis, indeed suggests that the correlation between the change in relative poverty risk and inequality weakened during the recession and the post-recession periods in terms of most inequality measures and particularly so in terms of the Gini coefficient and the P50:P10 ratio (see appendix Figure A4). The decrease in the correlation is more pronounced when poverty is measured by the poverty gap ratio (see appendix Figure A5).

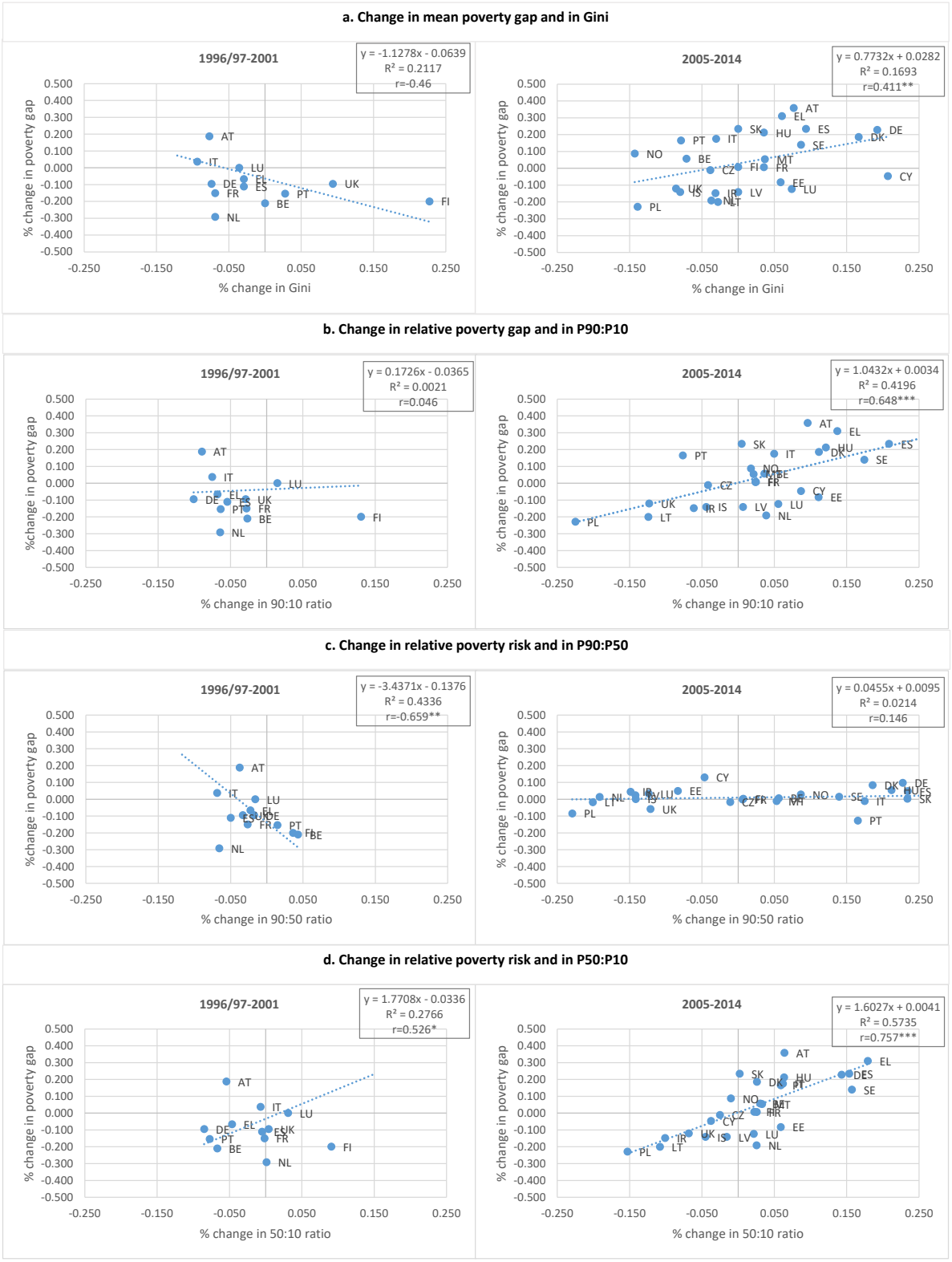
Figure 3: Changes in the relative poverty risk and changes inequality in different European countries between 1996/97 and 2001 and between 2005 and 2014

Figure 3: Changes in the relative poverty risk and changes inequality in different European countries between 1996/97 and 2001 and between 2005 and 2014



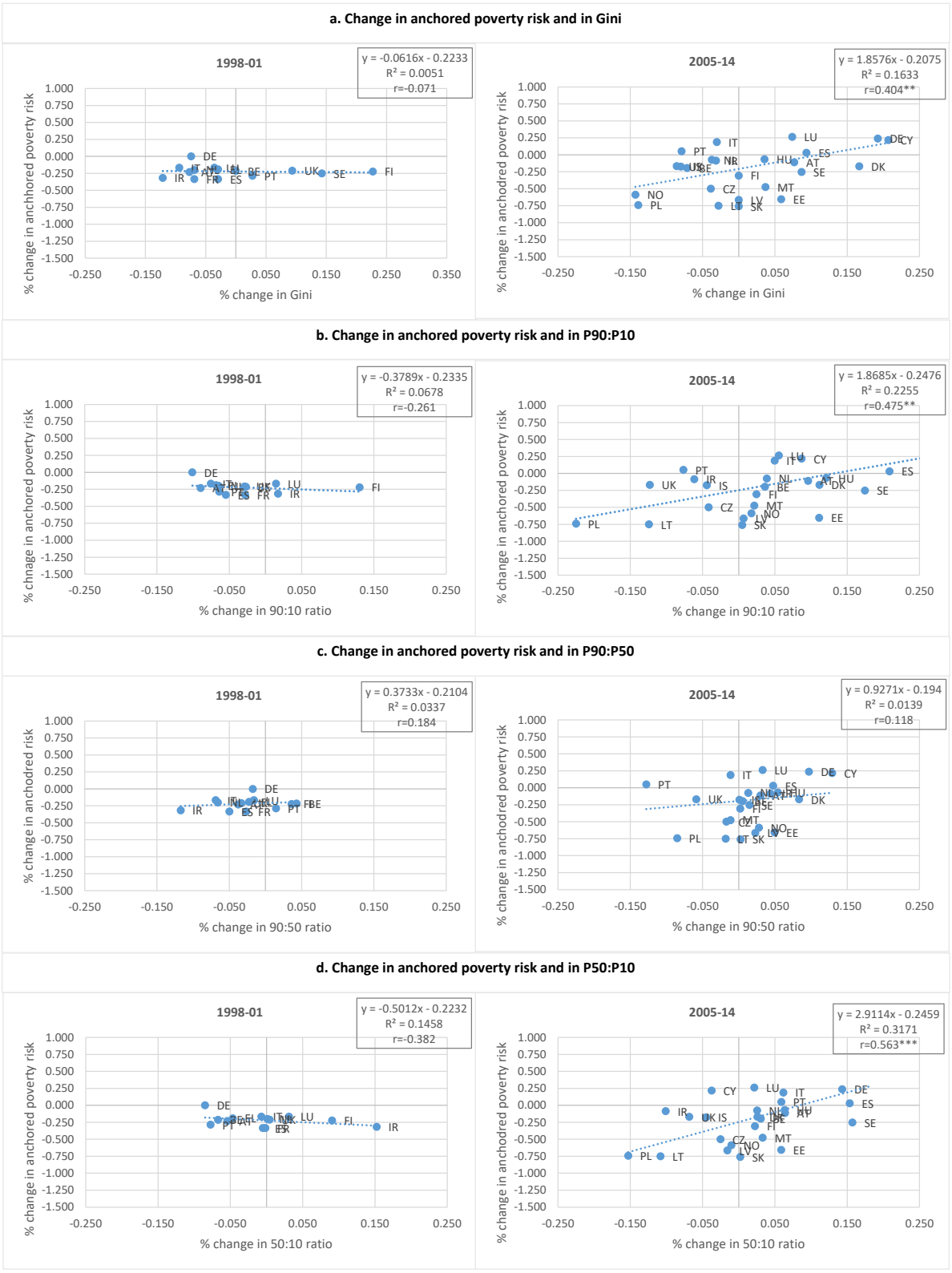
Note: Author's calculations based on statistics from ECHP and EU-SILC as published in EUROSTAT database. The sample in this graph includes all available observations in each time period.

Figure 4: Changes in the mean poverty gap and changes in inequality in different European countries between 1996/7 and 2001 and between 2005 and 2014



Note: Author's calculations based on statistics from ECHP and EU-SILC as published in EUROSTAT database. The sample in this graph includes all available observations in each time period.

Figure 5: Changes in anchored poverty risk and inequality in different European countries between 1998 and 2001 and between 2005 and 2014



Note: Author's calculations based on statistics from ECHP and EU-SILC as published in EUROSTAT database. The sample in this graph includes all available observations in each time period.

4.2 Inequality and poverty: Evidence from the OECD Income Distribution Database

This section briefly examines evidence on the relationship between poverty and inequality based on distributional statistics from the OECD database. Statistics from the OECD Income Distribution database allows to look at the relationship in OECD countries and to extend the analysis to cover most of the 1990s time period.

Figure 6 plots the relationship between growth in inequality (as measured by the Gini coefficient and the three percentile ratio measures we examined for the EU-SILC database) and growth in the relative poverty risk for OECD countries with available data in three time periods: from the early 1990 to early 2000s, from the early 2000s to 2008 and from 2008 to the most recent observation available (which for most countries is the year 2012).

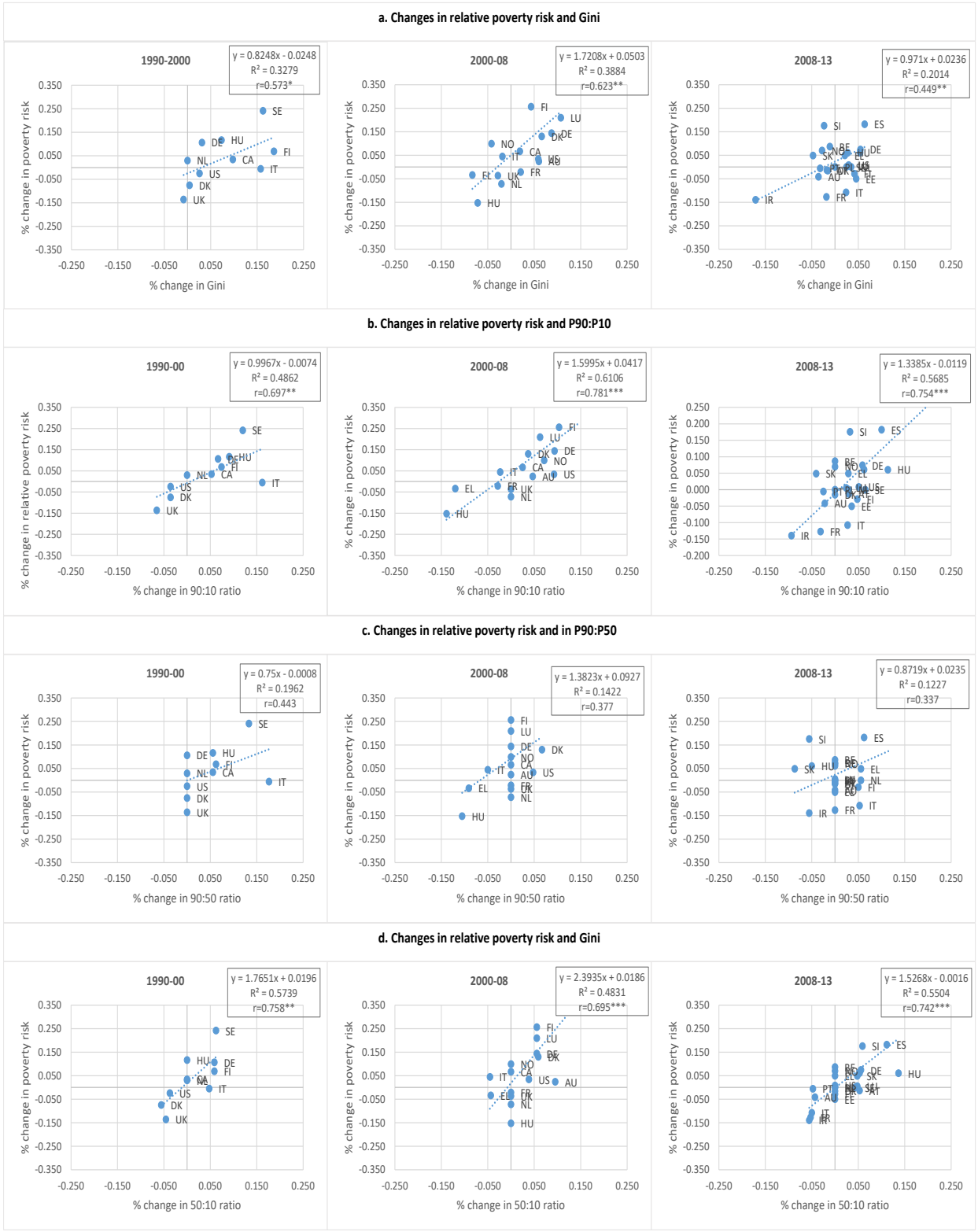
As it is immediately clear from this graph rising inequality was the dominant inequality trend in OECD countries in all three time periods. In the period 1990-00 the Gini coefficient increased in 8 out of the 10 (or for 80 per cent of) countries for which data are available (in this time period), while it increased in 9 out of the 15 (or 60 per cent of) countries with available data in the 2000-08 period, and in 15 out of 24 (or 62 per cent of) countries in the 2008-13 period. The increase in inequality is also evident in the percentile ratios measures albeit to a different degree in different time periods. During the 1990s the increase in inequality in most countries reflected a widening of the gap between the top income decile and both the mid and bottom income deciles (the P90:P10 increased in 6 out of 10 countries, the P90:P50 in 5 countries while the P50:P10 in 4 countries) while in the 2000-08 time period it was mostly evident as a widening in the gap between the bottom and both the top and mid income deciles (the P90:P10 inequality increase in 9 out 15 countries the P90:P50 ratio in only 2 out of 15 countries and the P50:P10 ratio in 7 out of 15 countries). In the 2008-12 time period, the P90:P10 ratio inequality increased in 13 out of 24 countries (or 54 per cent of the countries), the P90:P50 in 7 out of 24 countries (29 per cent) and the P50:P10 inequality in 11 out of 24 countries (46 per cent).

Turning to poverty developments we see that in all three time periods the rise in the relative poverty risk was the dominant poverty trend both overall and in countries with rising inequality. Only in a minority of countries with rising inequality was there a decrease in the relative poverty risk (examples can be found in the bottom right quadrant in each graph).

However, and similar to the evidence from the EU-SILC database, in some countries rising inequality was accompanied by falling poverty while in others poverty grew in periods of falling or stable inequality (though this crucially depends on the inequality index used and the weights it attaches to the distributional changes at different parts of the distribution). Just as rising poverty was the dominant poverty trend in countries with rising inequality, falling poverty was the dominant poverty trend among countries with falling inequality. But again both the magnitude and the direction of the change differed across countries. The simple correlation coefficients (reported in the bottom of the text boxes in each of the sub-graphs in Figure 6) show that there is positive (and in most cases statistically significant) correlation between the growth in poverty and the growth in inequality in all three time periods. The estimated correlations are stronger (both in terms of magnitude and statistical significance) for inequality measures that capture the degree of income dispersion between the bottom and other parts of the distribution than for those that capture the degree of income dispersion at above median income levels (i.e. in our case here the P90:P50 ratio). As stressed in the previous section, the weaker correlation between poverty and the P90:P50 ratio inequality is an artefact of the relative definition of income poverty (as much as the stronger correlation estimated between relative poverty and the P50:P10 ratio) and may reflect a technical link between the two statistics operated through the median.

Summarising, the evidence from both the Eurostat Income and Living Conditions and the OECD Income Distribution databases shows that while there is a positive and statistically significant correlation between poverty and inequality growth in all time periods considered there is quite a lot of heterogeneity in both the magnitude and the direction of poverty and inequality changes. As discussed in the previous section, this diversity in country experiences highlights the importance of policy and institutions in shaping the distributional outcomes in different countries.

Figure 6: Per cent changes in relative poverty risk and inequality in different OECD countries between 1990-2000, 2000-08 and 2008-13



Note: Author's analysis based on distributional statistics from the OECD Income Distribution Database (available at: https://stats.oecd.org/Index.aspx?DataSetCode=IDD.

4.3 Top incomes and poverty: Evidence from the World Wealth and Income Database

The evidence so far relied on the Gini coefficient and three percentile ratio measures to measure inequality. Assessing inequality in terms of all these measures together we can capture changes in the shape of the bulk of the distribution except from its tails. As it has been documented in a number of studies, not capturing the tails of the distribution may lead to incomplete characterisation of changes in the tails of the distribution and to a substantial underestimation of the overall level of inequality (Ruiz and Woloszoko, 2015; Causa et al., 2016; Burkhauser et al., 2017). In fact as has been demonstrated in the top incomes literature, adjusting for changes in top incomes inequality the rise in inequality over the last 15 years is much stronger than previously measured especially in Anglo-Saxon countries (Piketty and Saez, 2013; Jenkins, 2016). But capturing inequality at the tails of the income distribution is complicated by the fact that income at the tails of the distribution is measured with error in household surveys (which are also the underlying sources for the construction of the distributional statistics for both the EU-SILC and the OECD's Income Distribution databases).

This section therefore looks at additional indicators of income inequality i.e. the share of top 10 per cent in total income and the share of top 1 per cent in total income. Both these indicators are taken from the World Wealth and Income database (formerly called The World Top Income Database), an online database that includes long data series on the distribution of income and wealth in a large number of countries, covering the late-nineteenth and the majority of the twentieth century for many countries. The source of the statistics in the database is the usually administrative records usually tax returns data. Figure 7 relates the long term developments in these two top income shares indicators to the evolution of relative poverty risk (taken from the OECD Income Distribution Database) in 18 countries for which data are available at least since the mid-1980s.

As it has been documented in the top income literature (Atkinson et al., 2011; Piketty and Saez, 2013), after an initial reduction in top income shares in the post-war period, since the 1980s there has been a dramatic rise in the top income shares in the large majority of English-speaking countries, with the most dramatic being the rise in top income shares (especially the top 1 per cent income shares) in the US, Australia, Canada and the UK. Although less dramatic, the top income shares also rose in Sweden and Norway and France. In Germany, after falling initially between

1961 and 1973 the top 1 per cent income share inequality began to increase in the years after 2005 (the increase in the top 5 and top 10 per cent income share however occurred in late 1990s and the early 2000s). The increase in the top income shares among most industrialised countries after the post-war periods has been linked to the surge in top wage incomes (Atkinson et al., 2011). Additional explanations that have been put forward to explain the evolution of top income shares include the capital market liberalisation and privatisation, tax reforms as well as reductions of top income tax rates induced by political pressure as a result of changed remuneration policies (see Atkinson et al. 2011 for a thorough discussion of the possible explanations behind the evolution of top income inequality).

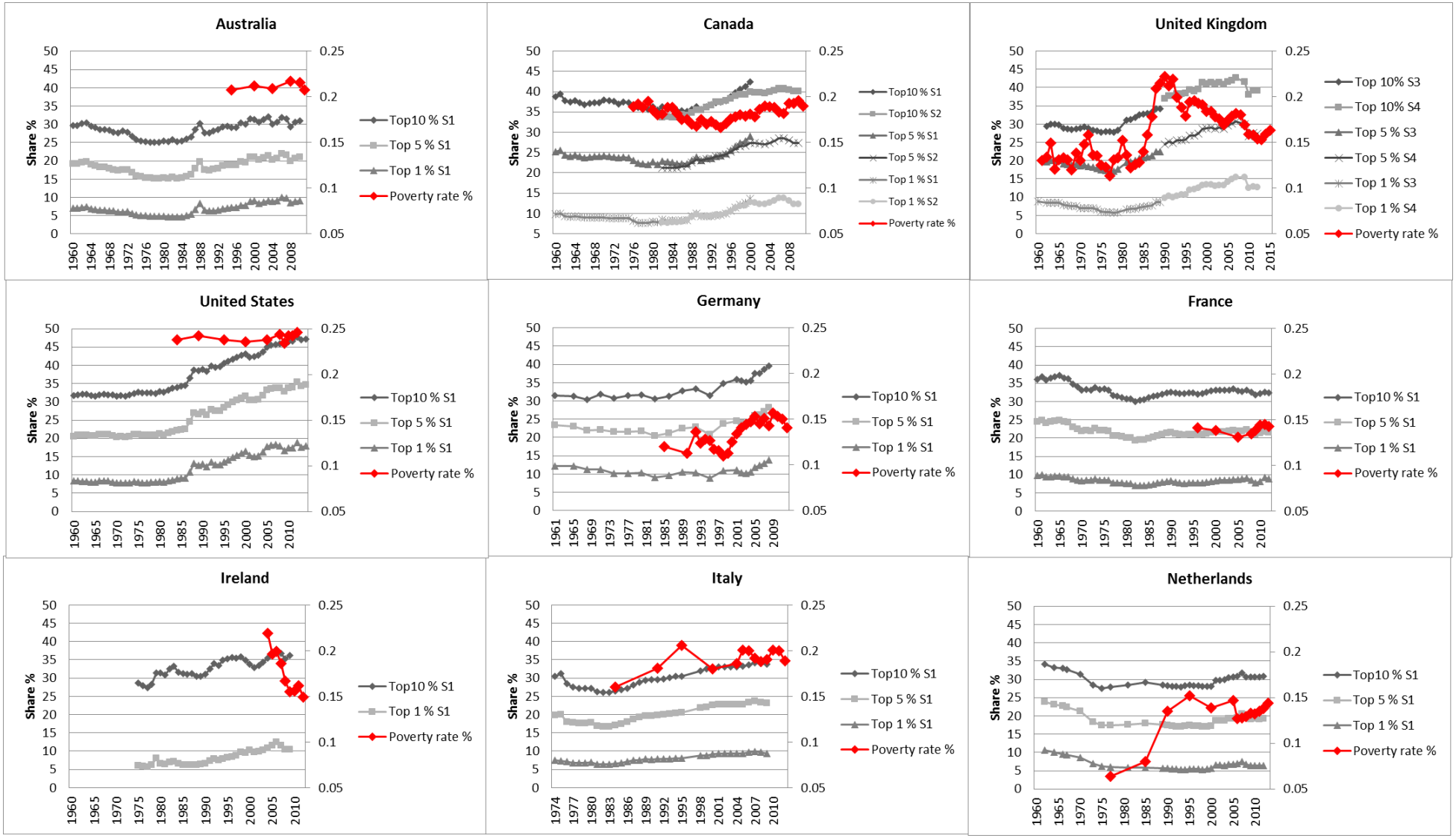
Looking at the joint evolution of top income shares inequality on the one hand, and of income poverty on the other hand, we see that while in general there have been countries and periods where poverty and top income shares moved in the same direction (i.e. either increased or decreased), the general picture points to a diversity in poverty and top income share inequality developments. In the US for example (which is probably the most pronounced case), there has been a continuous increase in top income shares especially since the 1980s even though the poverty rate (i.e. the proportion of the population with income below 60 per cent of median income) remained virtually unchanged. As it will be discussed in more detail in the next section (where poverty and inequality developments in the US, the UK, Denmark and Sweden are studied in more detail) the main reason behind the divergence in the evolution of poverty and top income inequality was that the rise in inequality in the US over this period was mainly driven by increases in the degree of inequality at above median income levels and the fact that the gains from income growth disproportionally benefited higher income households rather than middle and lower income households. This, combined with the fact that the relative dispersion of incomes at below median income levels remained relatively stable resulted in a relatively flat income poverty pattern over the period under examination.

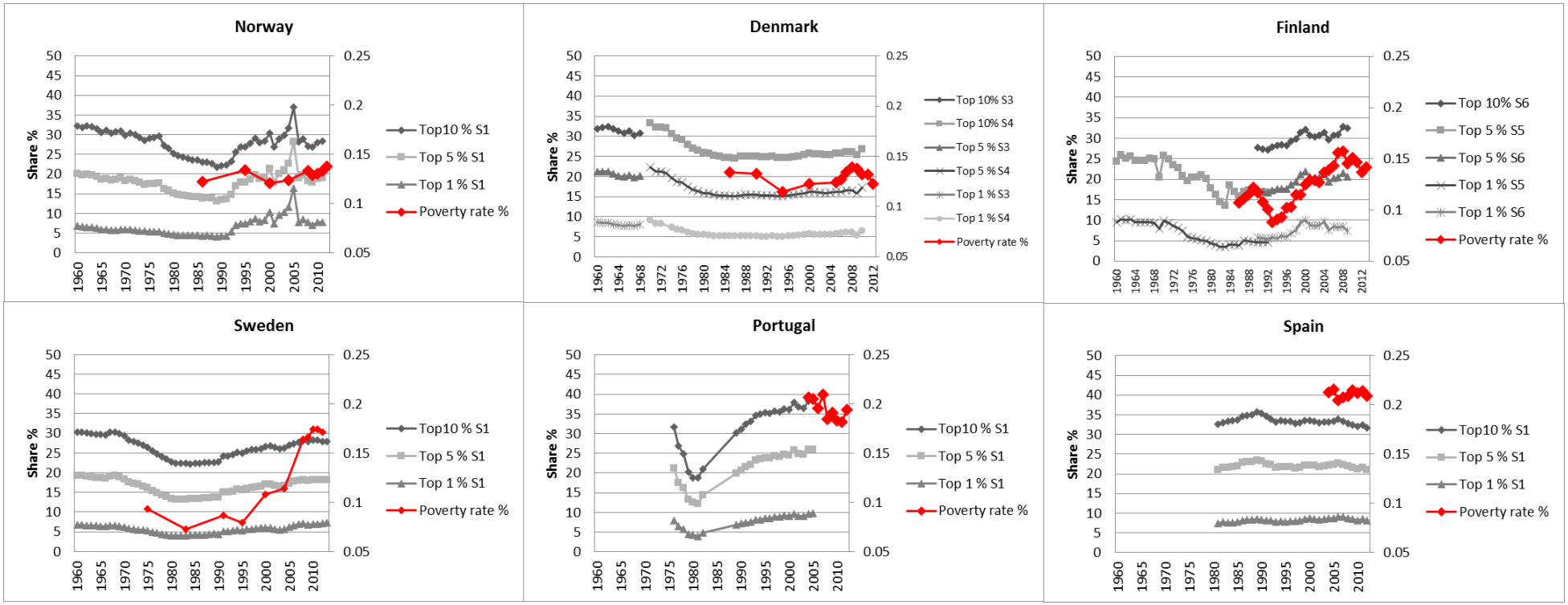
While less dramatic, the patterns in other countries also do not exhibit any particular consistent pattern in the way that poverty tracks the growth in top income shares inequality. In the UK the evolution of top income share inequality and poverty tracked each other very closely in the 1980s when both increased but from the early 1990s the two series moved largely in different directions (although there have been individual years when the two series moved in the same direction). The reverse pattern is observed in Canada: over most of the 1980s top income shares inequality in Canada rose substantially while poverty fell, but from the mid-1990s poverty and

top income share inequality statistics moved largely in the same direction (although again not always consistently). Of the other countries, most notable are Sweden and Norway. In Norway the rise in the top 1 per cent income share inequality from the early 1990s did not track consistently the evolution of relative poverty risk (however the evolution of relative poverty risk in Norway appear to track more closely the evolution of top 10 and 5 per cent income shares). On the other hand, the rise in top income inequality in Sweden from the early 1990s onwards coincided with a period of rapid poverty growth.

Summarising, the evidence in this section suggests that developments in top income inequality do not exhibit a strong correlation with poverty developments (although there were examples where the two statistics moved in the same direction). This general pattern which is echoing again the notion of 'episodes rather than trends' put forward by Atkinson (1997) (cited in Förster and Vleminclx, 2004) point out the differences in the mechanisms underlying the evolution of the two phenomena and highlights the importance of policy and institutions in shaping the distributional outcomes in different societies and time periods.

Figure 7: Top income shares (WID database) and relative poverty risk (OECD)





Notes: Top income share statistics are extracted from the World Top Wealth and Income database. The relative poverty risk data series is extracted from the OECD Income distribution database. Top income share measures are based on different series in some countries and years. S1: Top 10% (or 1%) income share excluding capital gains. S2: Top 10% (or 1%) income share – LAD (excluding capital gains). S3: Top 10% (or 1%) income share – married couples and single adults (excluding capital gains). S5: Top 10% (or 1%) income share – adults (excluding capital gains). S6: Top 10% (or 1%) income share – tax data. S7: Top 10% (or 1%) income share – IDS (excluding capital gains).

4.4 Multivariate models: Accounting for the effect of initial inequality, income and income growth

In this section we assess more fully whether changes in income poverty are statistically associated with changes in income inequality, by estimating a series of simple OLS regressions of the change in log poverty on the change in log income inequality. In estimating these models we use all available observations from four sub-periods covered by the Eurostat Income and Living Conditions database: 1996/97-01, 2005-08, 2008-12 and 2012-14. Similarly to the descriptive analysis in section 4.1, I estimate different models for each of the three poverty indicators (i.e. the relative poverty risk, the average poverty gap and the anchored poverty risk) and for the four different inequality indicators. In all models the standard errors are clustered at country level, to account for the fact that we have multiple observations for each country.

Table 1 presents the results from these regressions. The model estimates shown in columns (1)-(3) are from OLS regressions which use the change in log relative poverty risk as dependent variable, while those in columns (4)-(6) and in columns (7)-(9) from regressions which use respectively the change in log poverty gaps and the change in log anchored poverty risk as dependent variables. For each poverty indicator we estimate three specifications. The baseline specification, cols. (1), (4) and (7), includes only the change in log income inequality with no other controls. The second specification, cols. (2), (5) and (8), includes additional controls for the logarithm of inequality and the logarithm of the average net equivalised household income at the beginning of each time period (to account for price level differences across countries I use the purchasing power standard income measure). Finally, the third specification, cols. (3), (6) and (9), adds controls for the average annual growth rate in household income during each time period. This is computed by dividing the per cent change in average net household income in each country over the each time period by the number of years spanning each time period (to account for the fact that the time periods used in the analysis span different number of years). Rather than including income growth as a continuous variable we include three dummy variables indicating, negative (g<-0.05%), low (%-0.05<g< %1), mid (%1<g<%3) and high (g>%3).

Consistently with the patterns described in the previous section, the results from the baseline model in column (1) suggest a statistically significant positive correlation between the growth in inequality and the growth in the relative poverty risk. The correlation is stronger when inequality is measured by the P50:P10 ratio (beta: 0.83) and the P90:P10

ratio (beta: 0.77) and slightly weaker when inequality is measured by the Gini coefficient (beta: 0.60). Results from the baseline specification which uses the change in log poverty gaps as the dependent variable – presented in col. (4) – show that the relationship between the change in inequality and the change in the poverty gap is substantially weaker for all inequality measures especially when inequality is measured in terms of the Gini and the P90:P50 ratio. A positive relationship is also estimated between the change in inequality and the change in the anchored poverty risk but the coefficients are rather small (with the beta ranging between 33 per cent when inequality is measured by the P90:P10 ratio, 28 per cent when inequality is measured in terms of the P50:P10 ratio, 26 per cent when inequality is measured in terms of the Gini coefficient and 24 per cent in terms of the P90:P50 ratio).

The results from the second specification show that neither the initial level of inequality nor the initial level of income has any significant effect on the change in the relative poverty risk. Both variables, however, have a significant positive effect on the change in the anchored poverty risk. The coefficients on the initial level of inequality variable imply that economies with higher initial inequality reduce anchored poverty rate by less. The coefficients on the initial level of income is also positive, implying that countries with higher level of initial income reduce anchored poverty more slowly.

Results from models which add controls for average household income growth suggest that neither the income growth nor the initial level of income or the initial level of inequality have any significant impact on the change in the relative poverty risk or the change in relative poverty gap once we account for changes in inequality. In line with the Bourgingnon's (2004) discussion cited in the introduction, this suggests that neither the initial level of inequality nor the initial level of income or indeed household income growth matter for change in relative poverty risk: it is only the change in inequality that matters. On the other hand, both the initial levels of inequality and the initial levels of income have significant effects on the change in the anchored poverty risk. The coefficients from the anchored poverty risk model that include controls for both these variables imply that anchored poverty risk falls by less in economies with higher levels of initial inequality and with higher levels of initial income. However, when controls for household income growth are included in the anchored poverty risk model, the coefficient on the initial level of inequality variable falls and turns statistically insignificant implying a negative correlation between income growth and initial level of inequality (i.e. income grows less in countries with higher level of inequality). The coefficient on the initial level of income

variable also falls in magnitude when income growth controls are included in the model but its effect remains statistically significant. Consistent with expectations, the coefficients on the income growth variables suggest that anchored poverty risk falls more with higher income growth.

Table 1: Multivariate models of the relationship between changes in inequality and changes in poverty

	Dependent variable: Change in log relative poverty			**Dependent variable: Change in log average poverty gap**			**Dependent variable: Change in log anchored poverty risk**		
A. Gini	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Change in log	0.598**	0.580**	0.576**	0.128	0.107	0.132	0.259*	0.259**	0.283**
	(6.53)	(6.20)	(6.38)	(0.88)	(0.83)	(0.92)	(1.95)	(2.24)	(2.60)
Log income $_{base}$		-0.076	-0.036		0.134	-0.074		0.546**	0.214**
		(-0.81)	(-0.39)		(1.70)	(-0.89)		(4.45)	(2.67)
Log inequality$_{base}$		-0.145	-0.119		-0.028	-0.144		0.306**	0.168
		(-1.16)	(-0.92)		(-0.21)	(-1.20)		(2.16)	(1.31)
Income growth									
Mid			0.109			-0.058			-0.133**
			(1.08)			(-0.51)			(-2.85)
High			0.106			-0.278*			-0.278***
			(0.91)			(-1.71)			(-7.73)
Negative			0.022			0.225*			0.263**
			(0.24)			(1.87)			(2.71)
Obs.	88	88	88	88	88	88	88	88	88
Adjusted R-sq.	0.350	0.344	0.331	0.005	0.002	0.105	0.056	0.299	0.648
B. P90:P10									
Change in log	0.766**	0.795**	0.804**	0.393**	0.395**	0.376**	0.327**	0.290*	0.246**
	(7.69)	(8.70)	(9.33)	(3.57)	(3.50)	(3.59)	(2.09)	(2.03)	(2.08)
Log income $_{base}$		-0.144	-0.056		0.106	-0.095		0.555**	0.226***
		(-1.61)	(-0.65)		(1.22)	(-1.28)		(4.07)	(2.99)
Log inequality$_{base}$		-0.006	0.065		0.091	-0.007		0.289**	0.150
		(-0.07)	(0.76)		(0.95)	(-0.08)		(2.63)	(1.24)
Income growth									
Mid			0.109			-0.059			-0.133**
			(1.18)			(-0.56)			(-2.47)
High			0.113			-0.278*			-0.278***
			(1.11)			(-1.78)			(-7.19)
Negative			-0.089			0.184			0.223*
			(-1.16)			(1.48)			(1.85)
Obs.	88	88	88	88	88	88	88	88	88
Adjusted R-sq.	0.582	0.592	0.609	0.145	0.135	0.220	0.096	0.326	0.631
C. P90:P50									
ΔP90:P50	0.284**	0.277*	0.279**	0.036	-0.007	0.006	0.244	0.201	0.240**
	(2.24)	(2.01)	(2.11)	(0.22)	(-0.04)	(0.04)	(1.61)	(1.49)	(2.07)
Log income $_{base}$		-0.050	0.013		0.136	-0.061		0.557**	0.220***
		(-0.43)	(0.12)		(1.68)	(-0.76)		(4.23)	(2.81)
Log inequality$_{base}$		-0.134	0.012		-0.118	-0.265		0.630**	0.475
		(-0.40)	(0.04)		(-0.56)	(-1.21)		(2.56)	(1.60)
Income growth									
Mid			0.133			-0.055			-0.111*
			(1.06)			(-0.45)			(-1.90)
High			0.089			-0.279*			-0.279***
			(0.73)			(-1.72)			(-7.38)
Negative			-0.064			0.200			0.237**
			(-0.61)			(1.61)			(2.06)
Obs.	88	88	88	88	88	88	88	88	88
Adjusted R-sq.	0.070	0.050	0.044	-0.010	-0.010	0.082	0.048	0.281	0.630
D. P50:P10									
ΔP50:P10	0.832**	0.830**	0.850**	0.509**	0.513**	0.480**	0.276*	0.246*	0.168*
	(8.07)	(8.25)	(9.49)	(5.40)	(5.50)	(4.98)	(1.87)	(2.01)	(1.80)
Log income $_{base}$		-0.122	-0.012		0.126	-0.061		0.557**	0.226***
		(-1.57)	(-0.17)		(1.49)	(-0.74)		(4.35)	(3.24)
Log inequality$_{base}$		-0.202	-0.025		0.242	0.020		0.511**	0.152
		(-1.25)	(-0.16)		(1.13)	(0.09)		(2.12)	(0.67)
Income growth									
Mid			0.093			-0.067			-0.147**
			(1.42)			(-0.60)			(-2.38)
High			0.139			-0.263			-0.263***
			(1.58)			(-1.68)			(-6.71)
Negative			-0.116			0.156			0.223*
			(-1.65)			(1.22)			(1.79)
Obs.	88	88	88	88	88	88	88	88	88
Adjusted R-sq.	0.688	0.694	0.725	0.250	0.247	0.314	0.065	0.306	0.600

Note: Author's calculations based on published statistics from the Eurostat's EU-SILC. The initial level of income variable is the purchasing power standards adjusted income measure from Eurostat Standard of Living and Conditions database. The anchored poverty risk measure for the 1998-2001 period uses the 1998 poverty line as poverty threshold. For the 2005-08, 2008-12 and 2012-14 time periods the anchored poverty risk is calculated using the 2005 poverty line as poverty threshold. *, **, *** indicate significance at 10, 5 and 1 per cent levels respectively.

5. Detailed case study analyses: The case of the UK, US, Sweden and Denmark

Another way of looking at the relationship between poverty and inequality is to examine inequality and poverty within countries over time. The advantage of this approach is that we can relate inequality and poverty changes to developments in the labour market, the social security systems and the macro economy in each country and therefore gain a better understanding of the underlying drivers of the observed relationship. In our analysis we consider four countries: the UK, the US, Sweden and Denmark. Poverty and inequality statistics for all of the countries are taken from the OECD Income Distribution and the World Wealth and Income databases. These provide the longest time series for most countries. For the UK, the analysis is supplemented with statistics from the "Living standards, Inequality and Poverty" spreadsheet as published by the Institute for Fiscal Studies and which cover the period from 1961/62 to 2012/13.[7] For the US the OECD statistics are supplemented by poverty and inequality statistics from the US Census Current Population Survey statistics.

5.1 UK case study: Inequality and poverty developments over the period 1962-2015

Figure 8 shows trends in average income and in relative and absolute income poverty rates along with trends in inequality in the UK (as measured by the Gini coefficient, the P90:P10 ratio, the P50:P10 ratio, the P90:P50 ratio, and the top 10 and 1 per cent income shares). The income measure underlying all statistics in Figure 8 ,except from the top income share statistics is equivalised household disposable income before housing costs (BHC) and the unit of analysis is the individual. The income measure underlying the top income share statistics (extracted from the World Wealth and Income Database) is income excluding capital gains. Until 1989 the WID statistics for the UK relate to all tax units (married couples and single adults) while from 1990s onwards the estimates relate to all adults. Figure 9 shows trends in poverty and inequality in terms of the after housing cost income measure (AHC), a measure which accounts for the housing services that homeowners provide to themselves and is widely used in the UK to give a more comprehensive picture of household living standards by

[7] The statistics up to (and including) 1993/94 are based on the Family Expenditure Survey (FES), while those after this year are based on data from the Family Resources Survey (FRS).

accounting for differences in living standards between tenants and homeowners.

As shown in Figure 8 relative BHC income poverty rates virtually doubled over the 1980s (12 per cent in 1982 to 22 per cent in 1990). Relative income poverty rates have fallen back since then to 15.3 per cent in 2013/14 with recent falls driven mainly by falls in median incomes following the 2007/08 financial crisis (Jenkins et al. 2013; Hills et al. 2015; Brewer et al. 2013). In the latest two years for which data are available the relative poverty risk shows an upward trend (15.9 in 2014/15 and 16.3 in 2015/16). The anchored income poverty rate (i.e. proportion of people with equivalised household income less than 60 per cent of the 1998/99 median income level, adjusted for inflation) has fallen, reflecting the substantial real income growth since the early 1960s. However, it is important to note that the rate at which anchored poverty risk fell was much lower than the average income growth especially in the period after the mid-1980s, highlighting the unequal distribution of income growth gains.

Inequality also increased substantially over the 1980s, according to all inequality measures. The Gini coefficient rose from a value of around 0.25 in 1979 to a peak of 0.34 in the early 1990s. Since the early 1990s, changes in the Gini coefficient have been less dramatic. After falling slightly over the early- to mid-1990s it rose again reaching a new peak in 2000-01. It then fell for three years before starting to rise again reaching 0.35 again in 2009/10. In terms of the P90:P50 ratio, and the P90:P10 ratios the main period of rising income inequality also occurred over the 1980s with inequality remaining relatively stable since the early 1990s in terms of the P90:P50 ratio and falling slightly in terms of the P90:P10 and the P50:P10 ratios, diverging from the evolution of Gini. Overall, the picture is that of a rapid increase in income inequality in terms of all these measures during the 1980s and relatively stable or falling inequality over the 1990s and 2000s. The picture in terms of the top income shares inequality during the 1990s is very different. As panel c of Figure 10 shows, the share of income going to the highest-income individuals which also started to increase since the early 1980s, it continued to increase throughout the 1990s (driven almost entirely by the growth in the top 1% share), at least until the onset of the Great Recession. During the recession and the early post-recession period the share of income going to the top 1 per cent fell, although a break in the WID series in 2009 means that the data may not be completely comparable. Belfield et al. (2016) showed that the divergence in inequality developments in terms of most inequality measures that capture the degree of income dispersion at parts of the distribution but the very top and the top income shares inequality (i.e. the

narrowing of inequality across most of the distribution as captured for example by the change in P90:P10 inequality and the racing away of the very top) can be explained by various policy and labour market developments that took place in the UK over this period including the period of 'inclusive growth' from 1997 to 2004 and the Great Recession (Belfield et al., 2016). I will discuss this in more detail in the section below.

Overall, comparing poverty and inequality development in the UK over this period one can note that throughout the period and especially after 1990s, the relative poverty risk tracks more closely the P90:P10 and the P50:P10 ratios than either the Gini or the P90:P50 ratio. This is especially the case in the period between 1997 and 2000 when inequality in terms of the Gini coefficient and the P90:P50 ratio increased while the relative poverty risk decreased. After 2010 the pattern reversed: the dispersion at the top half of the distribution as measured by the P90:P50 ratio remained relatively stable while the dispersion at the bottom half of the distribution increased and the relative poverty risk decreased. The relative poverty risk does not appear to track closely the evolution of the top income shares between 1990s and the early 2000s. Between the early 2000s and the years leading to the financial crisis the two statistics moved in the same direction but after that the two statistics displayed a weaker correlation. Although the magnitude and time path of AHC income inequality and poverty developments are somewhat different from their BHC counterparts, the conclusions concerning how AHC income inequality and poverty track each other are broadly similar.

5.2 US case study: Inequality and poverty developments over the period 1974-2014

Figure 10 shows how poverty and inequality evolved in the US over the period 1974-2014 (the statistics underlying these figures are taken from the OECD Income Distribution database the World Wealth and Income database as well the US Census Current Population database). The US also experienced a substantial increase in inequality over this period. As has also been noted by the OECD, the most rapid growth in inequality in the US took place in three distinct time periods: between the 1980s and the early 1990s; during the early 2000s; and since the late 2000s (OECD, 2016). Overall, over the entire period, income inequality in the US increased by around 25 per cent in terms of the Gini coefficient (from around 0.32 in 1974 to 0.40 in 2013) and by more than 50 per cent in terms of the P90:P10 ratio (which increased from around 5.7 to almost 8.7).

The share of income going to the highest income individuals in the US increased even more dramatically over this period: the share of income held by the top 10 per cent of income earners increased from around 33 per cent in the mid-1970s to 50 per cent in 2014 (or by more than 50 per cent) while that of the top 1 per cent from 9 to 21 per cent (or by more than 130 per cent). On the other hand, the change in the degree of dispersion in the lower part of the distribution in the US was very small, as indicated by the very small change in the P50:P10 ratio. Therefore, the increase in inequality in the US over this period was due to rich households faring much better than both middle and low income households. This was translated into increased concentration of income at the top of the distribution and into income compression at the middle and lower part of the distribution. As a result of the patterns described above, and unlike the UK, the increase in inequality in the US was not accompanied by comparable increases in the relative poverty risk. The main reason was that the rise in inequality in the US was mainly driven by increases in the degree of inequality at above median income levels and the fact that the gains from income growth disproportionally benefited higher income households rather than middle and lower income households. This combined with the fact that the relative dispersion of incomes at below median income levels remained relatively stable resulted in a relatively flat income poverty profile.

5.3 Sweden case study: Inequality and poverty developments over the period 1973-2014

Figure 11 shows the pattern of poverty and inequality change in Sweden. As it has been widely documented, while still equal compared to many countries, Sweden has witnessed a very dramatic growth in income inequality (OECD, 2011). As noted in the OECD's (2015) income inequality update for Sweden the growth in income inequality between 1985 and the early 2010s in Sweden was the largest among all OECD countries. As can be seen in Figure 11 the most rapid growth in disposable income inequality in Sweden occurred between 1995 and 2005 and between 2004 and 2008 (i.e. in the period leading to the financial crisis). After 2008 the level of income inequality grew but at a much lower rate. Increases in income inequality were faster in terms of the P50:P10 ratio than in terms of the P90:P50 ratio, suggesting that increases in inequality in Sweden during this period were largely driven by increases in the income dispersion at below the median income levels. Overall, in 2012, the P90:P10 ratio in Sweden was around 3.3 compared to 2.6 in the 1990s. At the same time Sweden's richest 1% of income earners saw their share of total income almost double,

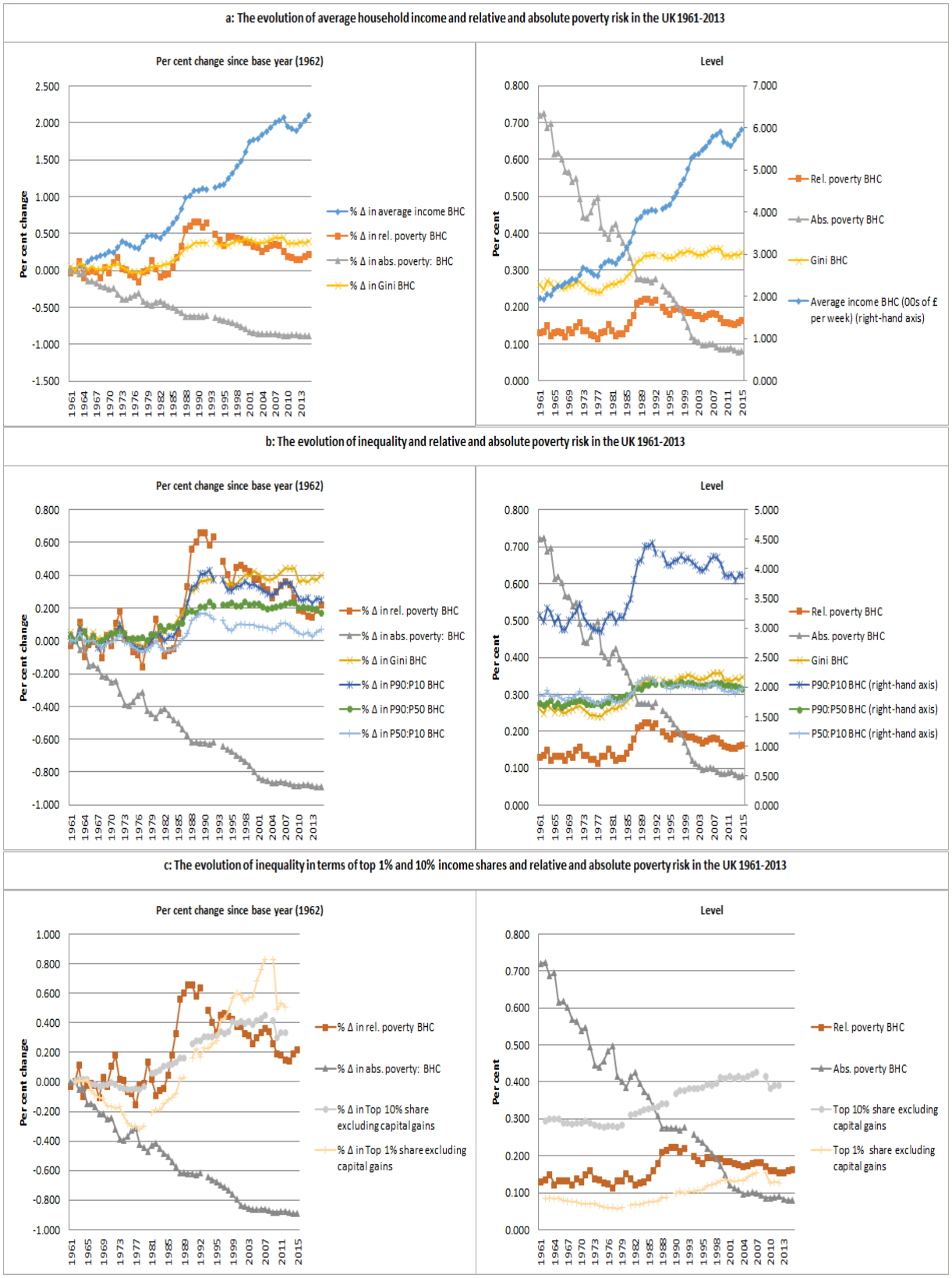
from around 4 per cent in early 1980s to more than 7 per cent in 2013 (Figure 11 panel c). Increases in income inequality in Sweden over this period were accompanied by even more rapid increases in the relative poverty risk: overall in the period from the mid-1970s to 2012 the relative poverty risk almost doubled (from around 9 per cent in the mid-1970s to over 17 per cent in 2012). In Sweden, as in other countries, although poverty and inequality statistics move in the same direction in most years/periods, there were sub-periods when poverty and inequality developments in terms of the measures considered here did not track each other.

5.4 Denmark case study: Inequality and poverty developments over the period 1985-2013

Another country characterised by low income inequality and low relative poverty risk is Denmark. According to data from the OECD Income Distribution database, the level of disposable income inequality in Denmark as measured by the Gini coefficient in 2012 was 24.9 much lower than the OECD average of 31.5 but close to the level of inequality prevailing in other Nordic countries (although lower than in Sweden). The low level of income inequality in Denmark can be linked to its strong welfare state but also the relatively low market income inequality which characterises Denmark (Causa et al., 2016). Looking at how income inequality and poverty evolved over the period 1985-2012 we see that in contrast to Sweden, changes in poverty and inequality during this period in Denmark were considerably smaller (Figure 12).

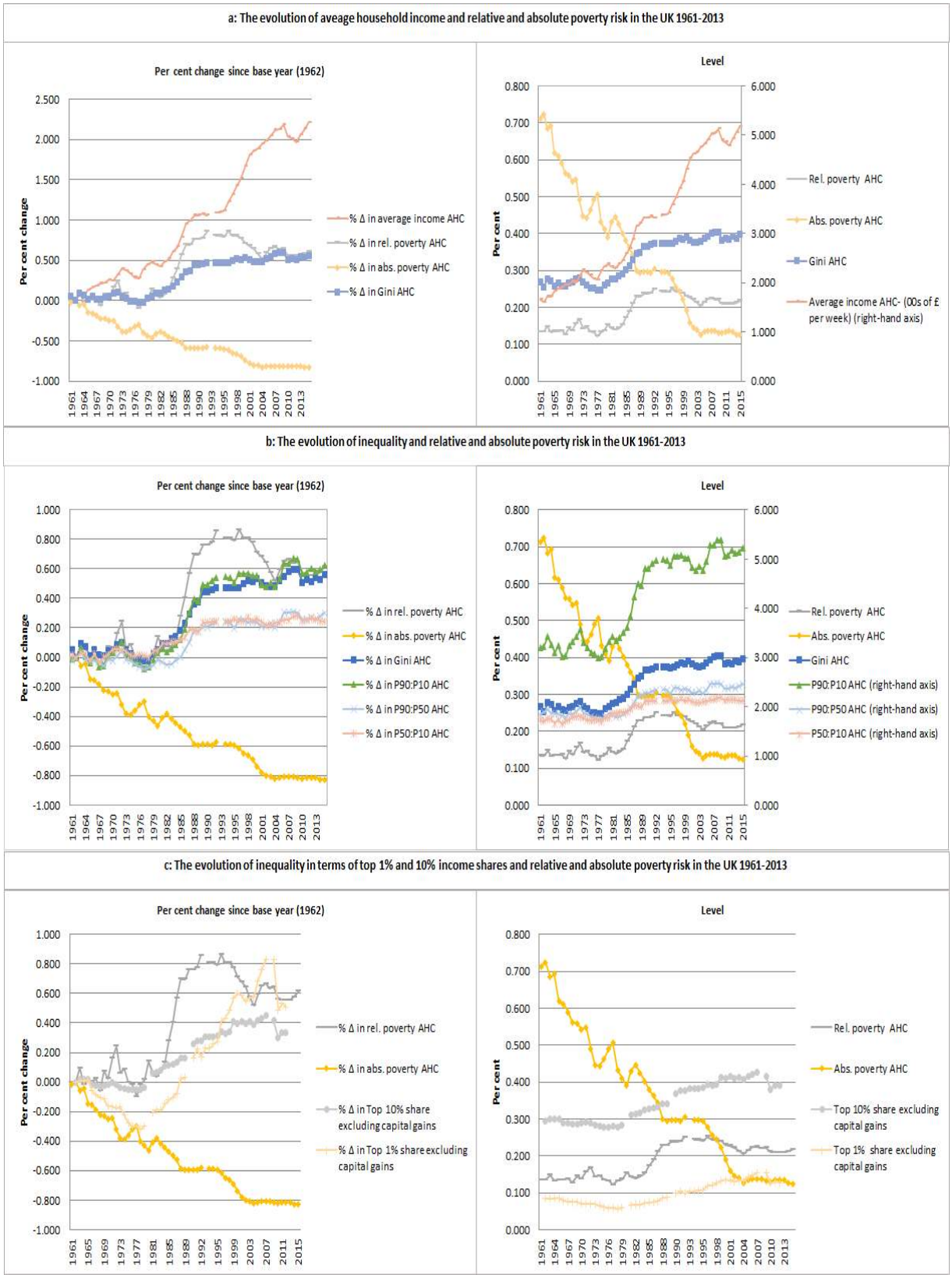
The relative poverty risk decreased slightly between the mid-1980s and the mid-1990s, it increased from the mid-1990s until the onset of Great Recession, and then decreased again after 2008. Overall, however, changes in the relative poverty risk in Denmark over the entire period were very small: throughout the period the relative poverty risk stood at around 12-13 per cent. Changes in income inequality were slightly more pronounced, but again substantially smaller than those taking place in either the UK, the US or even Sweden. The Gini coefficient increased from a minimum of around 21.5 per cent in 1995 to around 25 per cent just before the Recession. It then decreased in the first years of the Recession (reaching a level of 23.8 in 2009), before increasing slightly again in the following year reaching 24.9 in 2012. It has to be noted that if capital income was included in the income measure (which is not included in the OECD income measure) the increase in income inequality would be higher. Indeed, recent analysis conducted by the Danish government suggests that rising capital income accounted for a significant increase in the government's estimates of Gini inequality according to official statistics (Causa et al., 2016).

Figure 8: Poverty and inequality developments on BHC income basis in the UK: 1962-2015



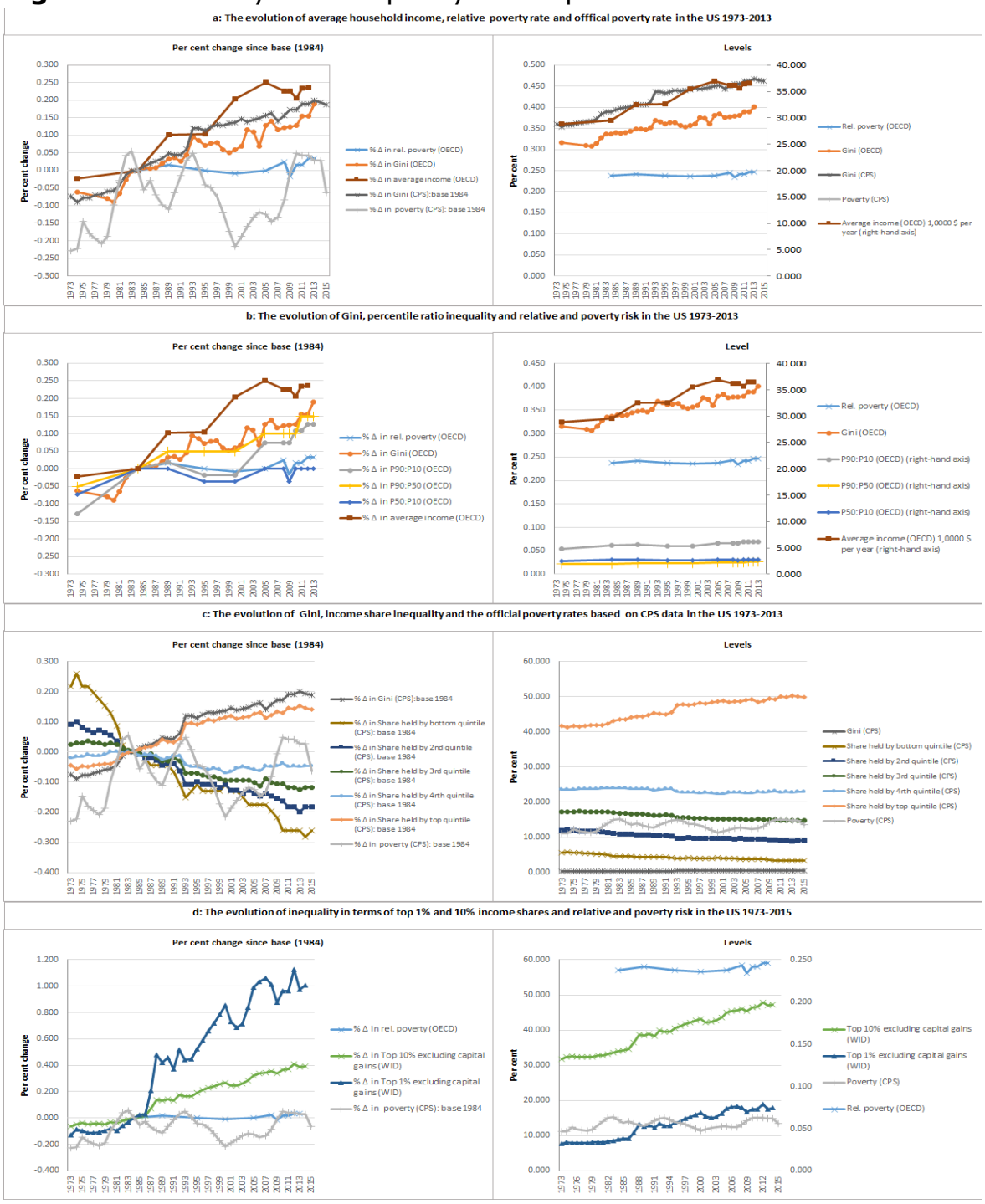
***Notes**:* The statistics underlying the graphs are extracted from the Institute for Fiscal Studies: Living Standards, Inequality and Poverty Spreadsheet and the World Wealth and Income database. Top income shares series exclude income from capital gains and the unit of analysis is adults.

Figure 9: Poverty and inequality developments on AHC income basis in the UK: 1962-2015



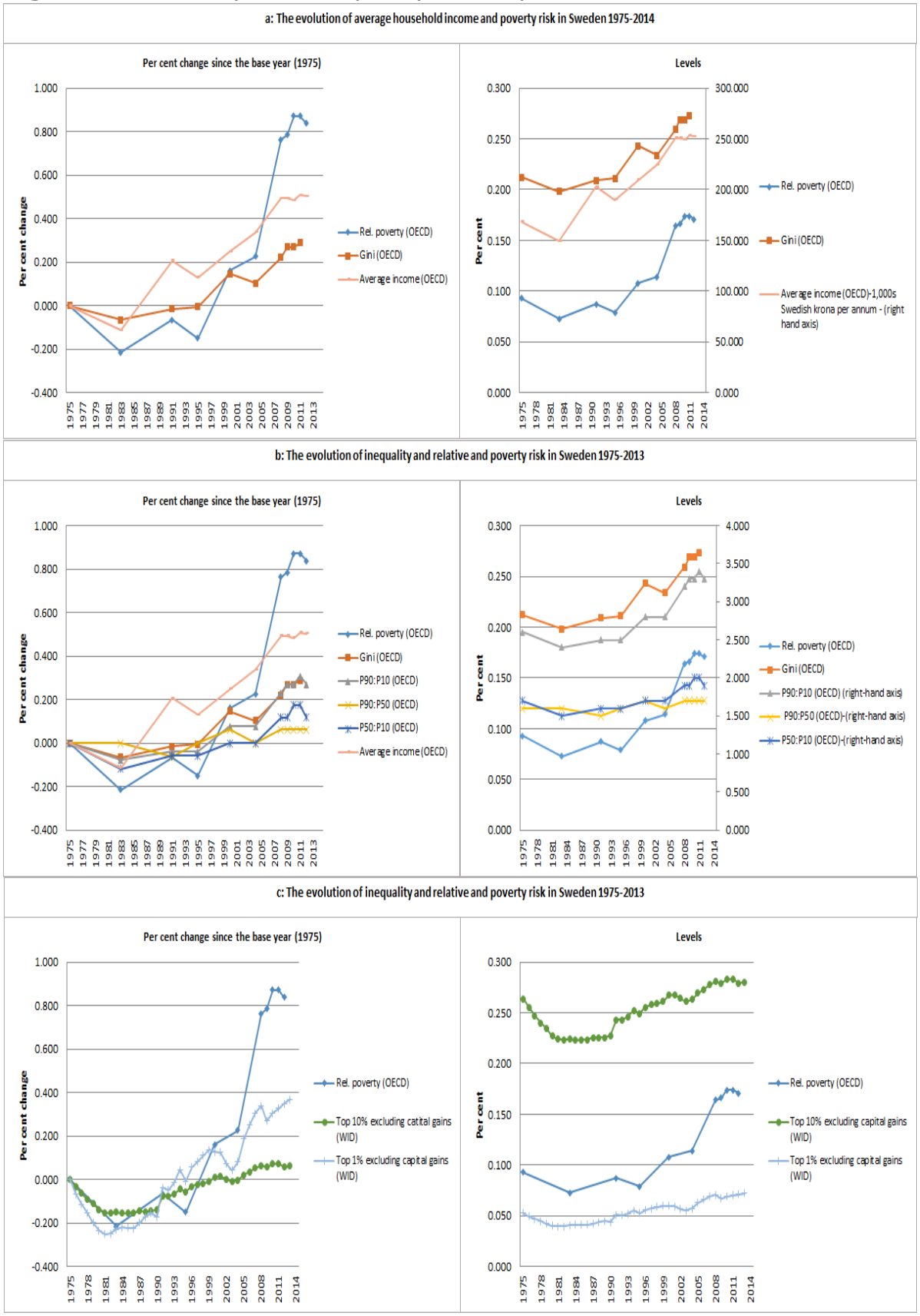
***Notes**:* The statistics underlying the graphs are extracted from the Institute for Fiscal Studies: Living Standards, Inequality and Poverty Spreadsheet and the World Wealth and Income database. Top income shares series exclude income from capital gains. The unit of analysis of the top income shares statistics was couples and single persons till 1989 and from 1990 onwards all adults.

Figure 10: Poverty and inequality developments in the US: 1973-2015



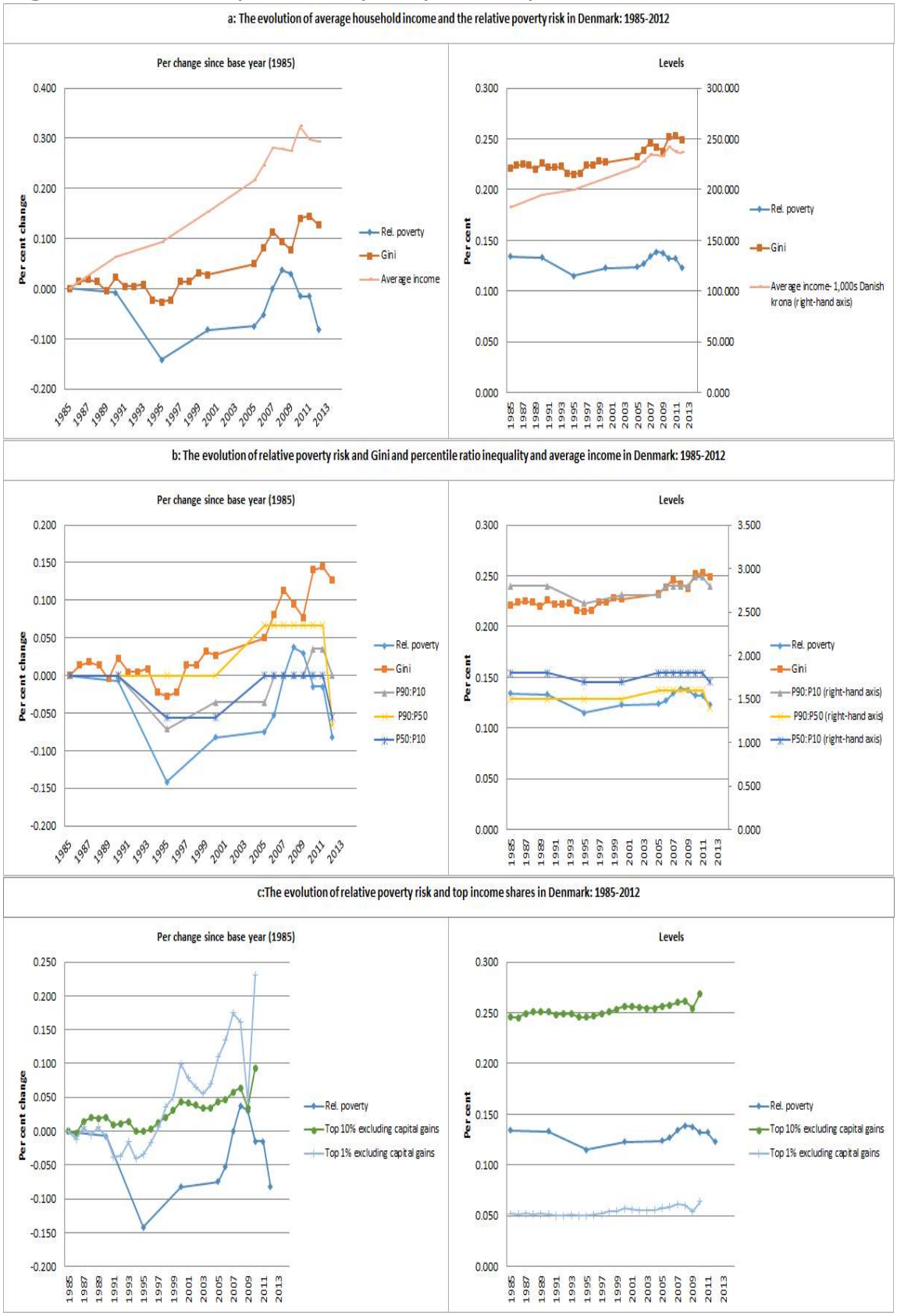
***Notes**:* Author's calculations based on OECD Income Distribution database, the World Wealth and Income database and the US Bureau of the Census, Current Population Survey, Annual Social and Economic Supplements. Top income shares income exclude income from capital gains and the unit of analysis is all adults. The income measure in the CPS database is equivalence adjusted household income. It includes cash income received on a regular basis (exclusive of certain money receipts such as capital gains) and before payments for personal income taxes but gross of income taxes such as social security. This series is adjusted for changes in family size. The U.S. Census Bureau determines poverty status by comparing pre-tax cash income against a threshold that is set at three times the cost of a minimum food diet in 1963, updated annually for inflation using the Consumer Price Index, and adjusted for family size, composition, and age of householder. In 2015, the most recent year for which data are available, the poverty threshold for a family of four was $24,257.

Figure 11: Poverty and inequality developments in Sweden: 1975-2014



Notes: Author's calculations based on statistics from OECD Income Distribution and World Wealth and Income databases. Top income shares statistics exclude income from capital gains and the unit of analysis is all adults.

Figure 12: Poverty and inequality developments in Denmark: 1985-2012



Notes: Author's calculations based on statistics from OECD Income Distribution and World Wealth and Income databases. Top income shares statistics exclude income from capital gains and the unit of analysis is all adults.

5.5 Discussion of the main factors driving the inequality and poverty developments in the four countries

The poverty and inequality developments described above can be linked to various country-specific policy and societal developments as well as global economic forces. As discussed in OECD (2011), in the United States, as in many other OECD countries, the single most important *direct* driver of growing inequality has been the rise in the dispersion in wages and salaries: the gap between the richest and the poorest 10 per cent of full-time workers has increased by almost one third which substantially higher than in most other OECD countries (OECD, 2011). Other socio-demographic changes (e.g. higher prevalence of single and single-parent households, more people with a partner in the same earnings group) were also found to play some role but this was relatively minor. According to OECD's analysis in the US these factors accounted for only about 13 per cent of the increase in household earnings inequality (OECD, 2011). By comparison, according to the same OECD study the widening dispersion of men's earnings contributed about 46 per cent of the overall increase in inequality, while the increase in employment, both among women and men, countered the increase toward higher inequality.

Changes in wage/earnings inequality themselves have been linked to globalization, technological change and various policy reforms. The argument about the inequality increasing effect of technological change is that people with skills in high demand saw their earnings rise significantly while workers with low and middle skills have been left behind, widening the dispersion of earnings (OECD, 2011; OECD, 2014; Krueger, 2002). As stressed in OECD (2011) various policy reforms have also been linked with the rise in wage inequality. For example the US like many other OECD countries witnessed regulatory reforms, both in the markets for goods and services and in the labour market which resulted in lower minimum to median wage ratios, lower benefit replacement rates or weaker employment protection legislation, lower union density or coverage of collective-bargaining arrangements. All these developments have been linked with increased productivity, economic growth and employment (especially among women and low-paid workers) on the one hand, but also with increased part-time and low-paid work and more atypical labour contracts on the other hand, widening the dispersion of wages (OECD, 2011). Despite having a significant positive impact on employment growth, the rise in the supply of skilled workers only partially offset the increase in wage dispersion (OECD, 2011).

In the UK, the increase in income inequality in the 1980s was attributed to skill-biased technological change (Machin, 2001), along with weaker trade unions (Machin, 1996; Goodman and Sheppard, 2002) and regressive changes to the tax and benefit system (Belfield et al., 2016). As we saw in section 5.1 income inequality in the UK since the 1990s was characterised by a substantial rise in inequality at the top (as captured by the substantial rise in top income share) and falling inequality across the large majority of the income distribution as indicated by the decline in the P90:P10 ratio inequality. As it was also stressed by Belfield et al. (2016) the fall in net household income inequality across the majority of the distribution over this period in the UK came despite a rise in household earnings inequality. According to the study of Belfield et al (2016) the factors that acted to reduce income inequality include the redistributive effect of tax and benefit system towards working age households and especially poor families with children and the support provided by the social security system during the large earning shocks associated with the Great Recession and the improvements in the incomes of pensioners.

Changes in the social security and welfare state systems also played a significant role in the poverty and inequality developments in Sweden. Over the 1990s, there have been various reforms in the Swedish benefit system which resulted in a more targeted but less generous cash transfer system systems (OECD, 2015). In addition, over the 1990s the Swedish tax system has also underwent various reforms. These reforms decreased the tax burden, sometimes benefiting particularly wealthier households, e.g. by decreasing capital taxation and lowering or abandoning wealth taxation or decreasing the top marginal income tax rate - which dropped from 87 per cent in 1979 to 57 per cent in 2013 - (OECD, 2015). Overall, although the redistributive effect of income taxes and cash benefits in Sweden is still higher than the OECD average, it has weakened significantly over time (OECD, 2015). According to the same OECD's analysis in 2013 the redistributive effect of the Swedish tax and benefit system in reducing inequality among working age population stood at around 28 per cent – compared to the OECD average of 25 per cent - whereas it used to range between 35 per cent and 40 per cent prior to the mid-2000s.

The reductions in the marginal tax rates especially the reduction in the tax rates affecting top earners – income from work, capital income, wealth, inheritance, property taxes – also played a significant role in the poverty and inequality developments in other OECD countries. For examples, according to the OECD (2011) the top rates of personal income tax were equal or above 70 per cent in half of the OECD countries including the US in the mid-1970s, fell to around 40 per cent on average, by the late

2000s. Additional explanations that have been put forward to explain the rapid rise in top-income shares include: a more global market for talent; a growing use of performance-related pay which particularly benefitted top executives and finance professionals; changes in pay norms; the growth of the financial sector (OECD, 2011). There are also more political-economy arguments for the rise in top income shares, such as the spread of a "winner-takes-all" culture assisted by globalization, and the lobbying of political elites by high earners in order to preserve their rents (OECD, 2011).

6. Conclusions

This paper draws on comparative distributional statistics from a number of databases (including the European Union Statistics on Incomes and Living Conditions database, the OECD Income Distribution database and the World Wealth and Income Database) to investigate the empirical relationship between income poverty and income inequality in rich and middle income countries. Unlike much of the previous literature which has mainly focused on developing countries, the focus in this paper is on high and middle income countries. We estimate the strength of the association between income poverty and income inequality both by exploiting cross-country variation in the levels of poverty and levels inequality and by exploiting cross-country variation in the change of poverty and change of inequality over time in order both to understand the strength of the association in the two statistics but also to investigate how income inequality and poverty evolved over time and the extent to which rising inequality has been associated with increasing poverty and stagnating living standards among people in the lower parts of the distribution. The cross-country analysis is supplemented with detailed case studies analyses for the UK, US, Sweden and Denmark (using for the case of the UK and US additional distributional statistics from national databases) in order to gain a better understanding of the driving forces behind the correlation between poverty and inequality trends.

A number of findings emerge. First, analysis of cross-country variation in the levels of inequality and poverty reveals that there is a very strong positive and statistically significant cross-country correlation between levels of inequality and levels of poverty. The estimated correlation is stronger when inequality is measured by the Gini coefficient and the P90:P10 and the P50:P10 ratios by the P90:P50 ratio and when poverty is measured by relative poverty rates than by poverty gaps.

Secondly, evidence from cross-country analysis of changes in poverty and inequality suggests that there is strong cross-country correlation between changes in poverty (both anchored and relative) and inequality. Although the correlation between changes in income poverty and changes in income inequality remain strong and statistically significant in terms of most inequality measures (except from the P90:P50 ratio) it is weaker than the one identified by exploiting cross-country variation in the levels of inequality and poverty. The positive correlation between changes in relative poverty risk and changes in income inequality remain strong in a series of OLS regression models which control for the initial level of inequality and the initial level of income and income growth. Results from these models suggest that none of these three variables has any significant effect on the change in the relative poverty risk once we account for inequality growth. This suggests that neither the initial level of inequality nor the initial level of income or indeed the rate of income growth matter for change in relative poverty risk: it is only the change in inequality that matters in driving poverty developments. On the other hand, both the initial levels of inequality and the initial level of income have significant effects on the change in the anchored poverty risk. The coefficients from the anchored poverty risk model that include controls for both these variables imply that anchored poverty risk falls by less in economies with higher levels of initial inequality and with higher levels of initial average household income. However, when controls for income growth are included in the anchored poverty risk equation, the coefficient of the initial level of inequality variable falls and turns statistically insignificant implying a negative correlation between income growth and initial level of inequality (i.e. income grows less in countries with higher level of inequality). The coefficient of the initial level of income variable also falls in magnitude when income growth controls are included in the model but its effect remains statistically significant. Consistent with expectations, the coefficients on the income growth variables suggest that anchored poverty risk falls more when household income growth is higher.

Looking at the long term trends in the top 1 per cent income share inequality using data from the World Wealth and Income database and poverty rates statistics from the OECD database shows no consistent pattern in how these statistics track each other, suggesting that the forces that drive the evolution of top income inequality and poverty are different. Finally, despite the positive (and statistically significant) cross-country correlation between changes in poverty and changes in inequality, the analysis also identified the varying experiences of countries in how inequality and poverty evolved. In particular it was shown that while for the majority of countries and sub-periods rising inequality was

accompanied with rising poverty, there has been quite a lot of variation in both the magnitude and even in the direction of poverty changes (i.e. there were countries and sub-periods when inequality increases were accompanied by poverty decreases and vice versa). As discussed in various places in the paper this heterogeneity highlights the importance of policies and institutions in determining the relationship between inequality and poverty and indicates that it may not be appropriate to reach to broad brush conclusions about the mechanisms underlying the relationship between inequality and poverty. The fact that cross-country correlations between levels of poverty and inequality are stronger than cross-country correlations between changes in poverty and inequality also points out that there is certain degree of persistence in poverty and inequality developments which themselves may be down to idiosyncratic country-specific factors.

Given the importance of policies and institutions, in the final stage of our analysis we looked in detail at the evolution of poverty and inequality in four countries i.e. the US, the UK, Sweden and Denmark in order to gain a better understanding of how poverty and inequality trends relate to specific labour market and social policy developments in each of these countries and how these in turn translated into specific inequality and poverty outcomes in each country.

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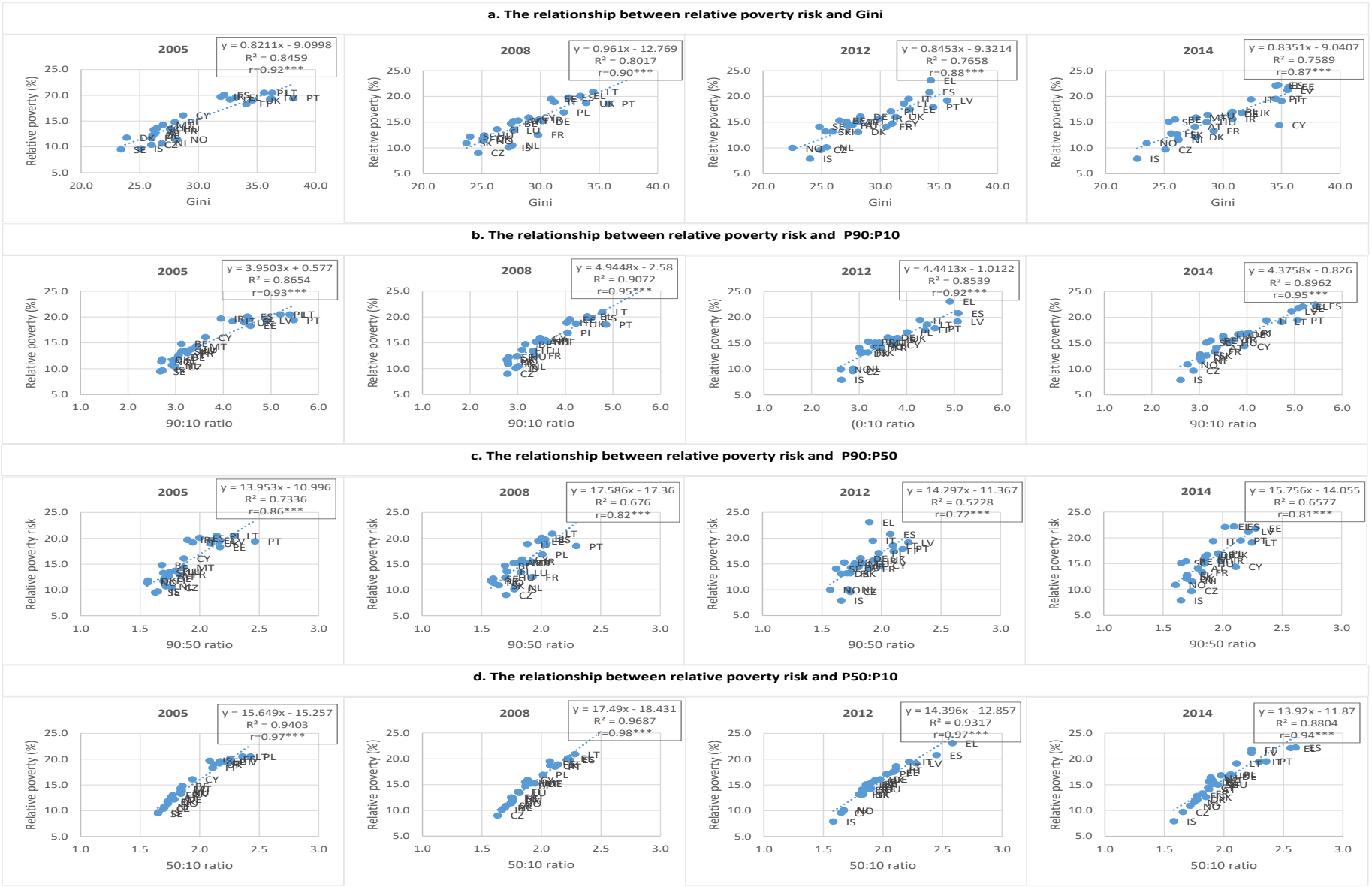
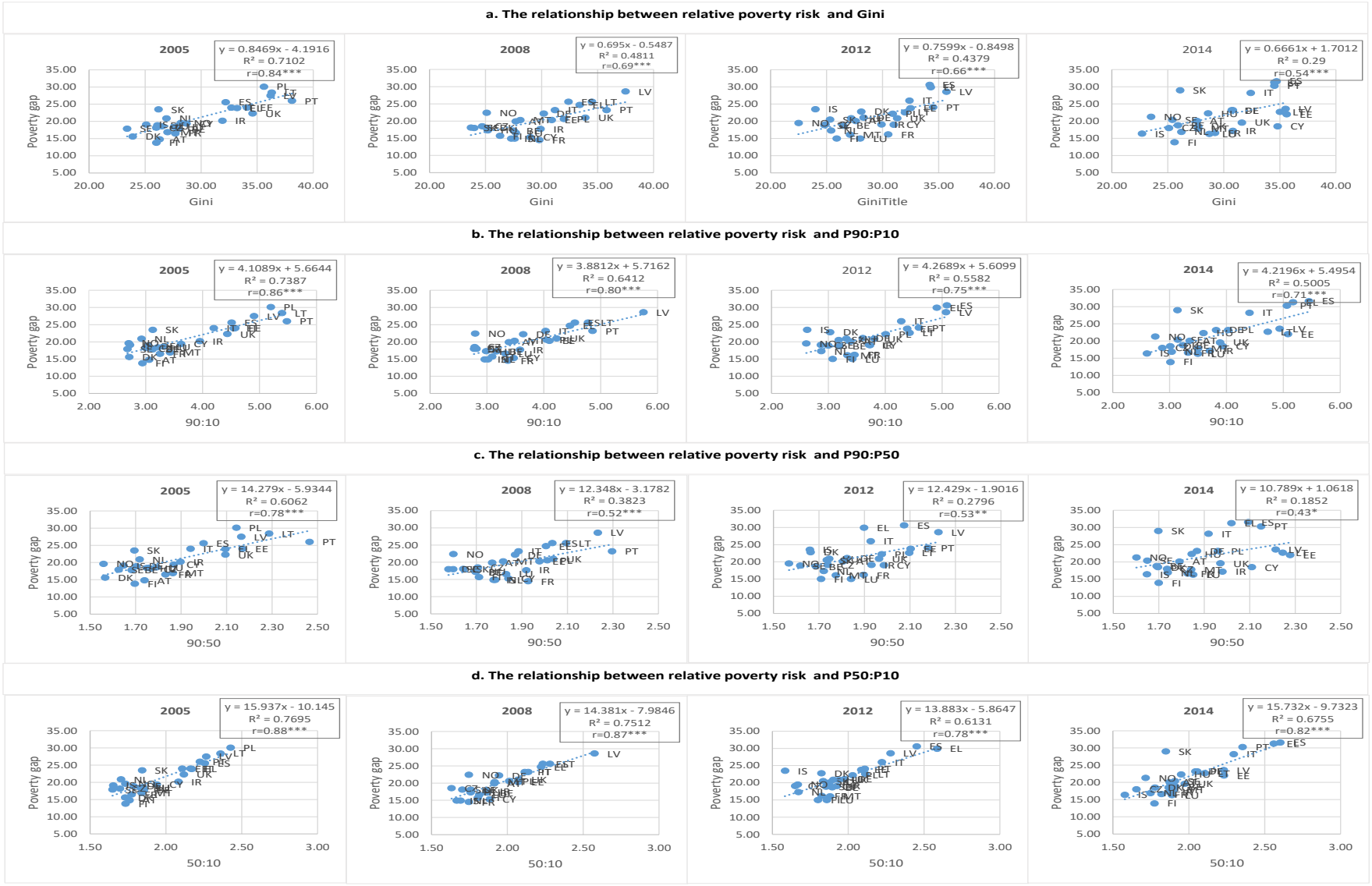
Figure A1: The cross-sectional relationship between poverty and inequality in 2005, 2008, 2012 and 2014 across European countries according to different inequality measures.



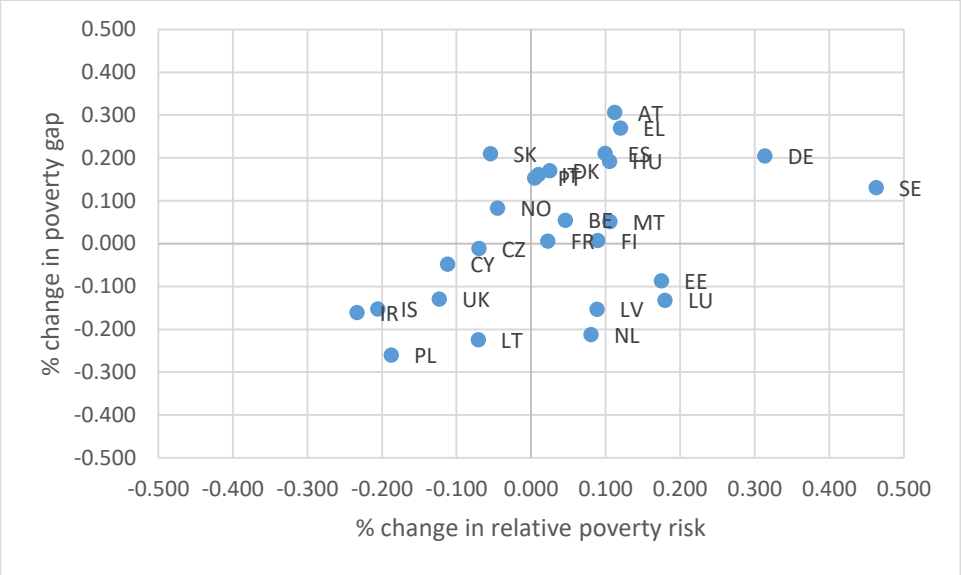
Note: Author's calculations based on statistics from EU-SILC as published in EUROSTAT database. Based on 26 countries which have poverty and inequality statistics in 2005, 2008, 2012 and 2014.

Figure A2: The cross-sectional relationship between levels of poverty and inequality in 2005, 2008, 2012 and 2014 across European countries according to different inequality measures.



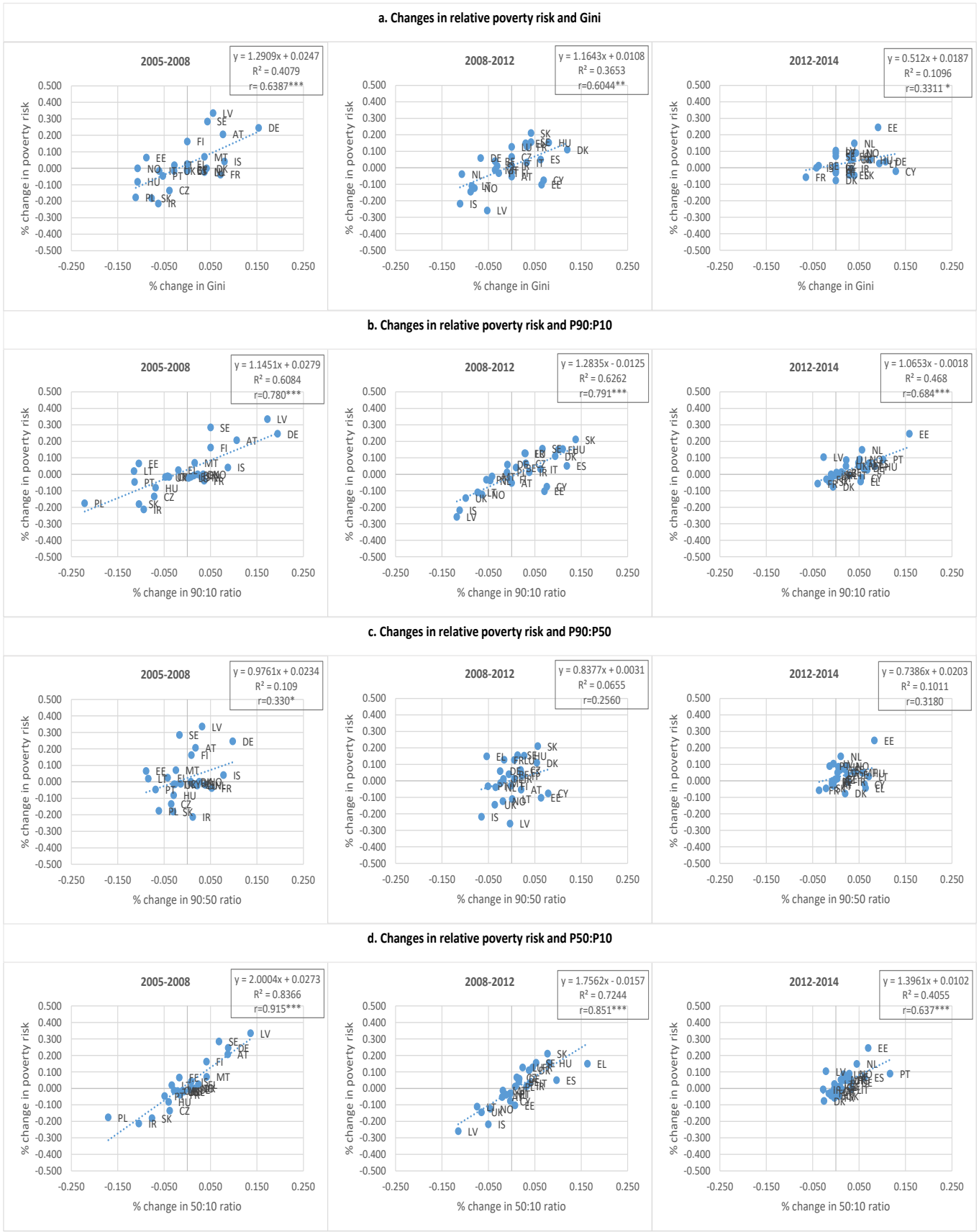
Note: Author's calculations based on statistics from EU-SILC as published in EUROSTAT database. Based on 26 countries which have poverty and inequality statistics in 2005, 2008, 2012 and 2014.

Figure A3: Change in relative poverty risk and poverty gap 2005-14



Note: Author's calculations based on statistics from EU-SILC database. Based on 26 countries which have poverty and inequality statistics in 2005, 2008, 2012 and 2014.

Figure A4: Changes in relative poverty risk and inequality in different European countries in 2005-08, 2008-12 and 2012-14

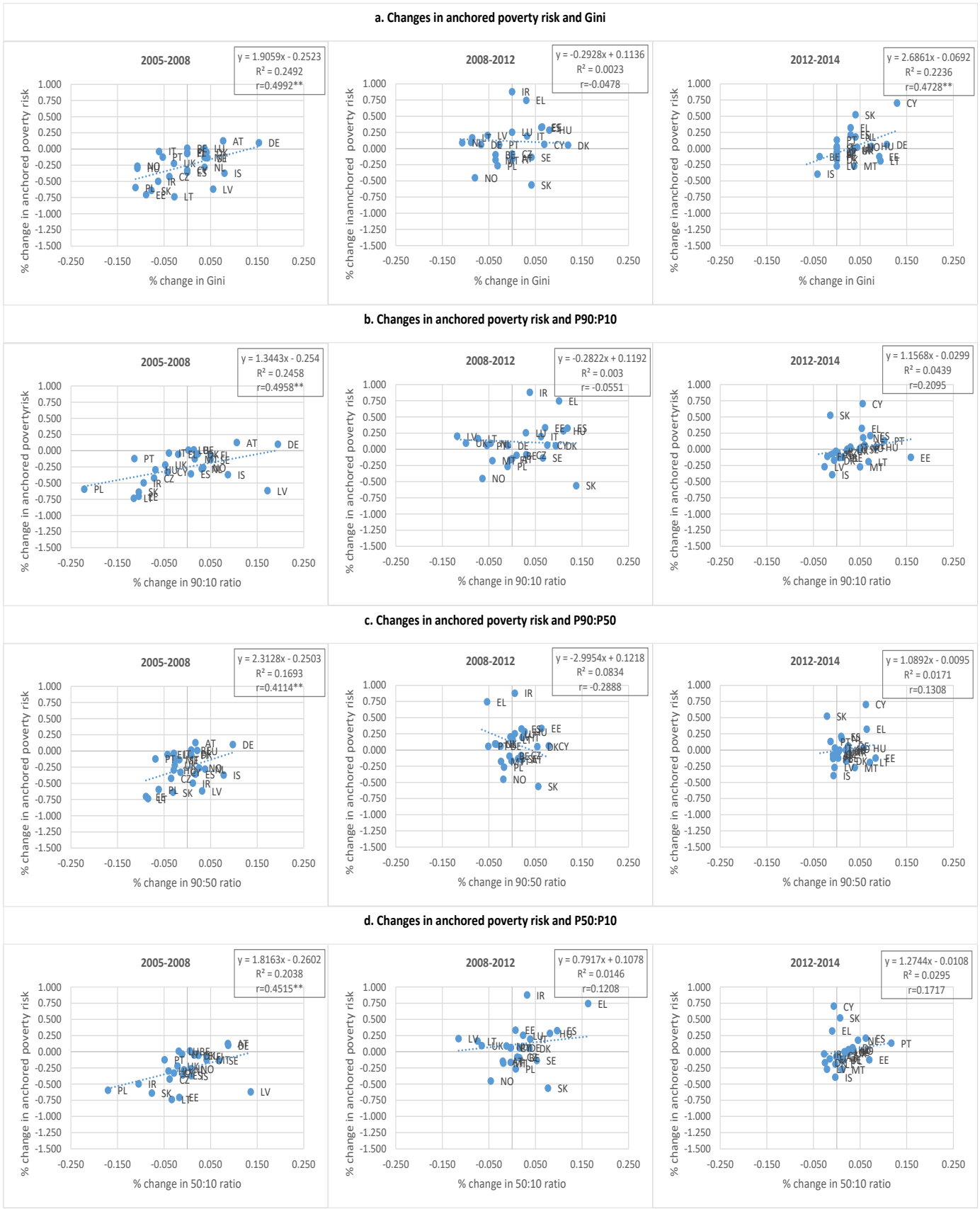


Note: Author's calculations based on statistics from EU-SILC database. Based on 26 countries which have poverty and inequality statistics in 2005, 2008, 2012 and 2014.

Figure A5: Changes in poverty gap and inequality in different European countries in 2005-08, 2008-12 and 2012-14

Note: Author's calculations based on statistics from EU-SILC database. Based on 26 countries which have poverty and inequality statistics in 2005, 2008, 2012 and 2014.

Figure A6: Changes in anchored poverty risk and inequality in different European countries in 2005-08, 2008-12 and 2012-14



Note: Author's calculations based on statistics from EU-SILC database. Based on 26 countries which have poverty and inequality statistics in 2005, 2008, 2012 and 2014.