Exactly How Has Income Inequality Changed?

Patterns of Distributional Change in Core Societies

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ABSTRACT

The recent resurgence of income inequality in some of the core societies has spawned a wide-ranging debate as to the culprits. Progress in this debate has been complicated by the fact that many of the theories that have been developed to account for the inequality upswing imply radically different patterns of distributional change, while predicting the same outcome in terms of the behavior of standard summary measures (e.g. a rise in the Gini coefficient or in Theil's inequality). Handcock and Morris (1999) have developed methods that allow the analyst to precisely identify patterns of distributional change and a set of summary measures to characterize such changes. These are based on the relative distribution, defined for our purposes as the ratio of the fraction of households in the baseline year to the fraction of households in the comparison year in each decile of the distribution of income. We use the available high-quality data from the Luxemburg Income Study to explore the evolution of household income inequality in 16 core societies. We describe exactly how inequality grew in some core societies since the late 1960s and discuss the extent to which patterns of distributional change were homogeneous or heterogeneous across the core. We find that: 1) rising inequality is generally associated with polarization, rather than upgrading or downgrading alone; 2) among those societies experiencing the largest increases in inequality, upgrading typically takes precedence over downgrading in the course of such polarization; and 3) declining inequality, where it occurs, has been the result of convergence, with the magnitude of the shift from the lower tail to the middle exceeding that of the shift from upper tail to the middle.

Keywords: core societies, income inequality, relative distribution, social change

Introduction

Two powerful icons have dominated descriptions of historical trends in income inequality in the United States and other industrial societies: the Kuznets curve and the Great U-Turn.

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Kuznets ([1955] 1965) saw common features in the inequality trajectories of a handful of industrial societies (UK, Germany and the US) during the 19th and 20th centuries suggesting a systematic pattern in which inequality at first increased, reached a peak, and later declined in the course of industrial development. This inverted U-shaped trajectory, the 'Kuznets curve,' was later shown to describe fairly well, but admittedly with considerable scatter, the relationship of income inequality with development in cross-sections of countries at various levels of development (e.g. Lecaillon et al., 1984; Nielsen, 1994).

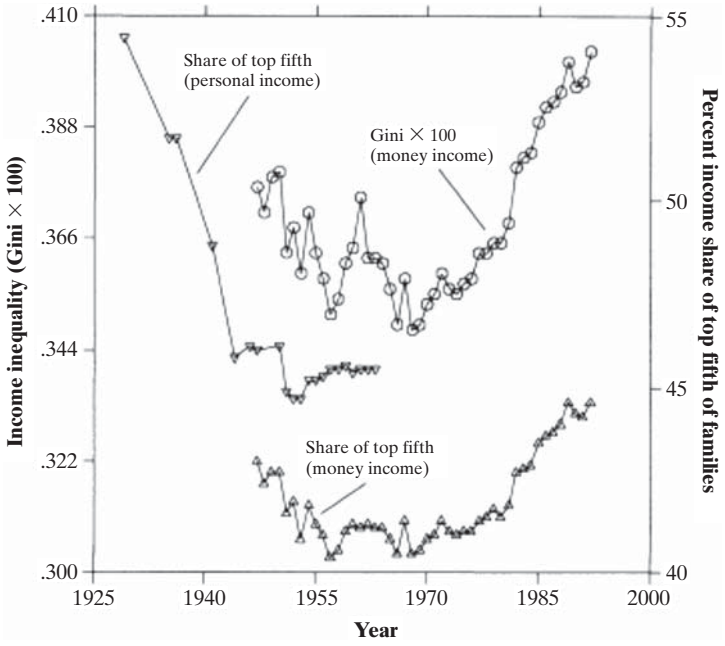
Later research based on more abundant longitudinal data showed that at least the descending right-most segment of the Kuznets curve provides a fair depiction of the experience of industrial countries over the course of the 20th century (Lindert and Williamson, 1985). In an influential study in which they assembled much of the historical data then available, Williamson and Lindert (1980) depicted the evolution of inequality in the United States as roughly consistent with the Kuznets curve. They described income inequality as rising during the second half of the 19th century, remaining high during the first decades of the 20th century (with a transitory decline during the First World War), and then declining during the Great Depression and the Second World War to reach the lowest level during the 1960s (see also Margo, 1999, and Lindert, 2000).

Beginning in the early 1970s in the United States, inequality in the distribution of household and family income began to rise. Figure 1 shows this reversal in the trend of declining inequality. The figure motivates vividly the 'Great U-Turn' label chosen by Harrison and Bluestone (1988) to describe this phase in the history of US inequality (see also Karoly, 1992).

Other advanced industrial countries have experienced upturns in inequality of varying severity during approximately the same period. Plotting the income inequality trajectories of 16 OECD countries over time, Alderson and Nielsen (2002) find that in the period since 1967, 10 of these countries experienced rising inequality, or a period of inequality decline followed by rising inequality. Freeman and Katz (1995) note a similar pattern for wage inequality among full-time male workers in 11 OECD countries from 1979 to 1990. They find that the inequality upswing was most severe for the UK, followed by the US, Canada, Australia, and Japan. The pattern of a pronounced rise in inequality for the US and the UK, compared to other industrial societies, holds for other measures of inequality as well (see also Gottschalk and Smeeding, 1997; Hatton and Williamson, 1998).

A wide variety of social trends have been proposed as possible causes of the rise in inequality in such societies. However, as Morris et al. (1994) have noted, a peculiarity of this discussion is that many of these trends suggest the same outcome in terms of the behavior of summary inequality measures (e.g. a rise in the Gini coefficient or in Theil's inequality), while implying radically different patterns of distributional change. Consequently, standard measures of

Figure 1.
Inequality in the distribution of family income by year, United States, 1929–92



Note: Percent income share (right-hand scale) is based on personal income for 1929 through 1964 and on money income for 1947 through 1992. Personal income includes money income plus certain nonmonetary forms of income such as estimated net rental value to owner-occupants of their homes.
Source: Reproduced from Nielsen and Alderson (1997: 13).

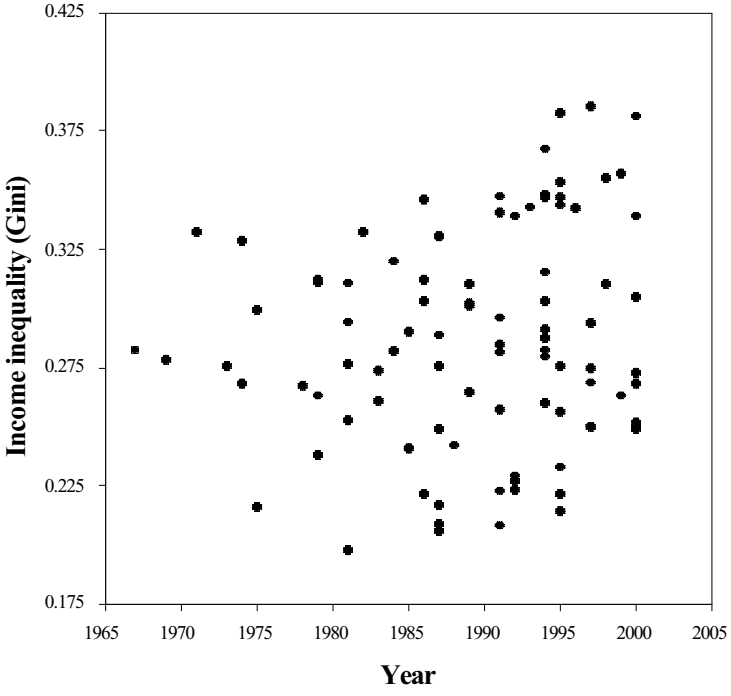
inequality may be less than ideal tools to use in adjudicating between these competing accounts of recent trends in inequality.

In this article we use relative distribution methods developed by Handcock and Morris (1999) to identify precisely where changes in the distribution of household income have occurred in core societies. Our ultimate aim is to explore the degree to which various accounts of inequality match on to the actual pattern of distributional change. In what follows we do the descriptive work necessary for this task and detail exactly how the distribution of income has been changing in the advanced industrial countries in recent decades.

Trends in Income Inequality: Evidence and Explanation

Figure 2 introduces the dataset that we employ in this article. These data are drawn from the Luxembourg Income Study (hereafter LIS), which is generally thought to provide the highest quality, most comparable data available. In Figure 2, we simply pool all of the available data; that is, we present every observation available on the 16 core societies in the LIS dataset.

Figure 2.
The LIS data: multiple observations on 16 core societies



Note: Figure includes all data available on core societies from the Luxembourg Income Study. Gini coefficient of income inequality (equivalent disposable income) calculated from the micro-data using a standard equivalence scale (e.g. Gustafsson and Johansson, 1999).

In their review of the literature on income inequality, Nielsen and Alderson (2001) divide factors contributing to rising inequality in the United States into: 1) trends related to the distribution of wages and earnings; 2) trends affecting the distribution of incomes of households and families, independent of factors affecting individual earnings; and 3) compositional effects by which changes in the proportions of various social groups affect the level of inequality in the overall distribution of income. In Table 1, we present a rather catholic list of the 'usual suspects' in this regard, and direct the reader to Nielsen and Alderson (2001) for details and for a critical evaluation of these arguments. As one can note, institutional changes, changes affecting the supply and demand for labor, the stability of earnings, and changes in household and family structure and composition have all been invoked to explain the increase in inequality in the US.

Very similar factors have of course been advanced to explain the recent inequality experience of other core societies. Indeed, scholars have increasingly begun to speak in terms of the existence of a 'unified theory' that would explain different trends in inequality across developed countries as the outcome of similar labor market and socio-demographic trends interacting with different

Table 1.
An overview of explanations of recent trends in inequality in the US

A.	Trends related to the distribution of wages and earnings
	1) *Institutional mechanisms*: de-unionization, declining minimum wage, changes in tax law, deregulation
	2) *Changes affecting labor supply*: population growth and the baby boom cohort, trends in education, declining skills of high school graduates, immigration, female labor force participation, government transfers
	3) *Changes affecting labor demand*: inequality and the business cycle, de-industrialization, globalization, technological changes, 'cognitive partitioning' and the value of cognitive skills, unequal returns to factors ('winner-take-all' society)
	4) *Changes affecting the stability of earnings*: rise of part-time labor, contingent labor, turnover
B.	Trends related to the distribution of income of households and families
	Changing living arrangements (e.g. female-headed households), female labor-force participation, assortative mating, income distribution and situation of the retired

institutional contexts (Wood, 1994; Blank, 1998; Blau and Kahn, 2002; DiPrete et al., 2004). It has not always been sufficiently appreciated that these explanations often imply very different patterns of distributional change, while predicting the same change in inequality as measured by standard summary measures. Morris et al. (1994) cast the debate over the factors responsible for the inequality upswing in the US as one between the 'job-skill mismatch' and 'polarization' theses. Authors in both camps, they note, use the same indicators of rising inequality as support for their arguments, ignoring the fact that 'the two explanations actually imply quite different patterns of growth in empirical inequality' (p. 206). Mismatch arguments attribute the growth of inequality to growth in the upper tail of the distribution, while polarization arguments attribute the inequality upswing to growth in both the upper and lower tails, or, alternatively, the 'decline of the middle.'

As is clear from Table 1, explaining inequality in the US and other core societies in fact turns on far more than the question of whether the past few decades have witnessed job-skill mismatch or an increasingly polarized job distribution. Nonetheless, Morris et al.'s (1994) central observation is important: in adjudicating between these competing accounts of the inequality upswing, it is important for researchers to be sensitive to what they imply for the precise pattern of distributional change. While all of the arguments outlined in Table 1 are designed to account for rising inequality, some attribute it to polarization (e.g. deindustrialization, globalization), others imply that it is attributable to the growth of the lower tail (e.g. declining minimum wage, population growth and the baby boom), and still others imply that inequality is rising owing to the growth of the upper tail (e.g. technological change, winner-take-all markets).

While it is already a difficult task to estimate the relative importance of factors affecting the distribution of earnings, it is even harder to assess the relative impact on overall inequality of mechanisms that may affect – largely independently – the distribution of earnings, on the one hand, and the distributions of income of households or families, on the other. In separating the wheat from the chaff, it would obviously be useful, as a first step, to compare patterns of distributional change implied by these arguments to the actual pattern of distributional change.

Our aim in this project is thus to determine exactly what has been going on 'behind' the summary measures of inequality and to address three basic questions: where inequality has increased, exactly how has it increased? To what extent is the pattern of distributional change in core societies homogeneous or heterogeneous? Finally, to what extent is the pattern of distributional change consistent with various theories of inequality? In this article, we provide some preliminary answers to the first two questions, although, as we shall see, our results do have clear implications for the latter question as well.

Methods

Handcock and Morris (1999) have developed methods that allow the analyst to identify where distributional changes have occurred and a set of summary measures to help characterize such changes. These are based on the 'relative distribution,' defined for our purposes as *the ratio of the fraction of households in the baseline year to the fraction of households in the comparison year in each decile of the distribution of income*. For example, to derive the relative distribution for the comparison year of 2000 using 1970 as the baseline year, we first divide households in 1970 into deciles of the distribution of household income. Then, to cancel out changes in location, we deflate income in 2000 by the ratio of the 1970 median to the 2000 median. Finally, we fit the 1970 decile boundaries to the 2000 distribution of households. If the fraction of households in a decile rises or falls over time, the relative distribution will rise or fall. If there is no change in the distribution, the relative distribution will be 'flat' (i.e. 10% of households fall in a given decile in 1970, and, if no change occurs, 10% will fall within the same bounds in 2000). In this fashion, then, one can distinguish graphically between growth, stability, or decline at specific points on the distribution.

Handcock and Morris (1999) have also developed an index to summarize one possible pattern of change the distribution of income – polarization. For quantile data Q, the *median relative polarization index* (MRP) takes the form (Morris et al., 1994: 217):

$$MRP_t(Q) = \frac{4}{Q-2}\left|\frac{i-\frac{1}{2}}{Q}-\frac{1}{2}\right| X\left(g_t(i)-\frac{Q}{Q-2}\right),$$

where $g_t(i)$ is the relative distribution, the proportion of year t's households whose median-adjusted incomes fall between each pair of quantile cut points, divided by the proportion in the baseline year, $i = 1, 2, \ldots, Q$, and the adjustment by ½ establishes the mid-point for each quantile. As one can note, the middle of the formula gives greater weight to the tails in weighting the relative distribution of quantile i by its distance from the median. The index varies between –1 and 1. It takes the value of 0 when there has been no change in the distribution of household income relative to the baseline year. Positive values signify relative polarization (i.e. growth in the tails of the distribution) and negative values signify relative convergence toward the center of the distribution (i.e. less polarization).

The median relative polarization index can be decomposed into the contributions to distributional change made by the segments of the distribution above and below the median (Handcock and Morris, 1999). For quantile data, the *lower relative polarization index* (LRP) and the *upper relative polarization index* (URP) are calculated as

$$LRP_t / URP_t(Q) = \frac{8}{Q-2}\left|i - \frac{1}{2}\right| - \frac{1}{2}\left| X\left(g_t(i) - \frac{Q}{Q-2}\right)\right|$$

They have the same theoretical range as the MRP and decompose the overall polarization index (Morris et al., 1994: 209):

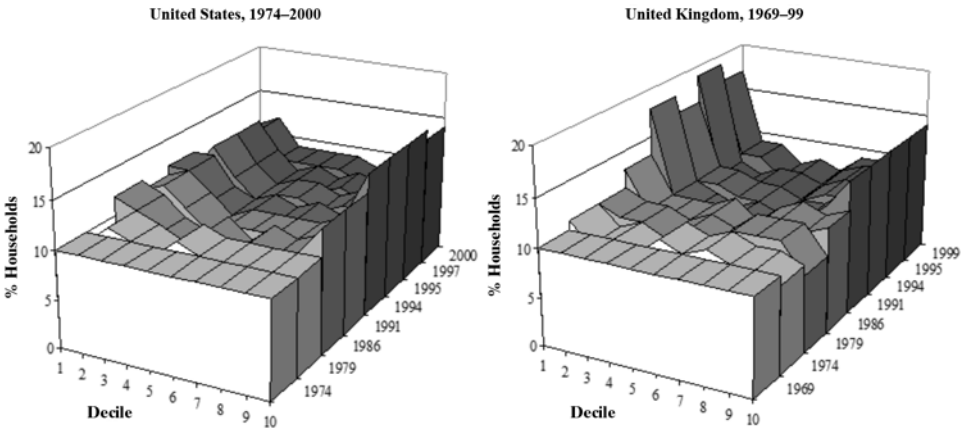
$$\mathrm{MRP_t} = ½\,\mathrm{LRP_t} + ½\,\mathrm{URP_t}.$$

Results

Exactly how did inequality rise in the core societies that have experienced an inequality upswing since the late 1960s? To answer this question, we begin by focusing on two of the more famous (or infamous) U-turns on inequality – that which began in the US around 1970 and that which took off in the UK in the later 1970s. The LIS series for the UK begins in 1969 and ends in 1999. For the UK then, we calculate relative distributions using 1969 as the baseline year. In the case of the US, the LIS series begins in 1974 and ends in 2000 and we therefore calculate relative distributions using 1974 as the baseline year. (One could, of course, use any set of baseline and comparison years in the LIS series for the UK or US, but for the purposes of presentation, we chose here to examine the longest span available in each country.)

Figure 3 displays the evolution of the relative distribution in both countries. Since the late 1960s, the middle of the distribution has been visibly 'hollowed out' in both countries. In other words, the story of rising inequality in both countries was in fact a story of polarization, of the decline of the middle

Figure 3.
Relative distributions, US 1974–2000 and UK 1969–99

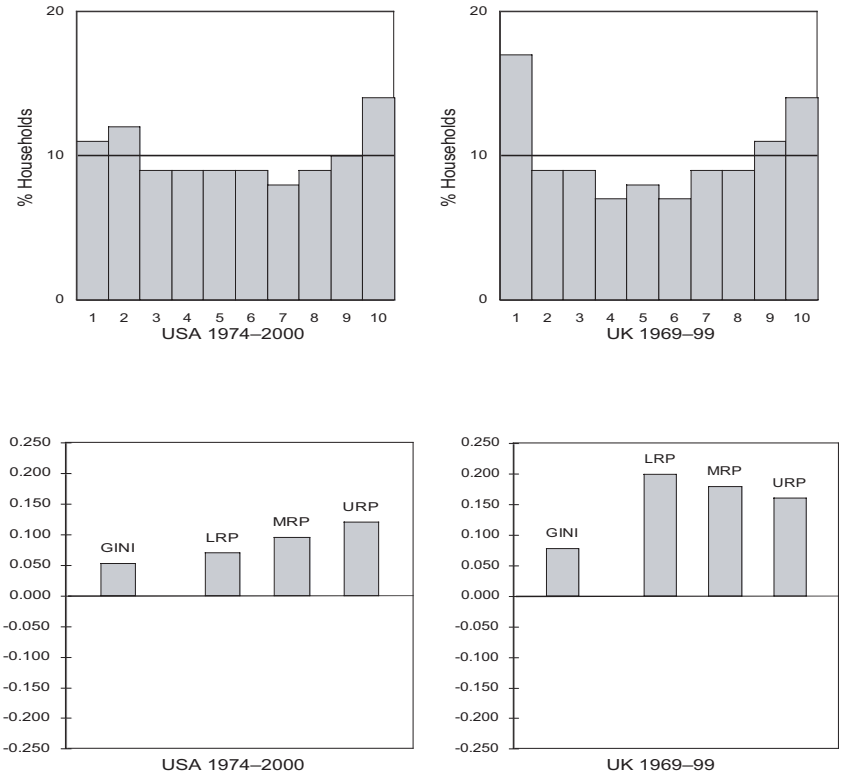


and simultaneous growth of the top and bottom of the income distribution (cf. Figure 2 in Morris et al., 1994: 211, for the evolution of individual earnings inequality in the US).

Figure 4 takes a closer look at the growth of inequality over the longest period available for both counties in the LIS data. For the US, this compares 2000 to the baseline year of 1974, and, for the UK compares 1999 to the baseline year of 1969. How does one interpret the figures in the top row of Figure 4? When there are 10 percent of households in a given decile, this means that there has been no change at that point on the distribution over the period under consideration. So, for instance, the ninth decile of the 1974 distribution of household income in the US contained relatively as many households in 2000 as it did in 1974. Values less than 10 indicate relative decline. So values for the 3rd to 8th deciles in the US and the 2nd to 8th deciles in the UK mean that, in relative terms, there were fewer households in the middle of the distribution at the end of each period than there were at the beginning. By 2000 or 1999, respectively, distribution of households had shifted to the tails, to those deciles with values greater than 10.

To summarize these changes, we present in the figures below the change in the Gini coefficient in each country and Handcock and Morris's (1999) polarization indices. Over the available period, the Gini coefficient rose by .078 in the UK, the largest increase in inequality in the LIS dataset for a core society. The US experienced a smaller, yet comparatively substantial increase across the 1974–2000 period. This appears in the first bar from the left in both figures. The mean relative polarization index (MRP), appearing in the third bar from the left, is positive in both countries, confirming the visual impression that one gets from the figures above. Again, then, rather than *solely* being a story of 'upgrading' – defined as the movement of households into the upper tail of the

Figure 4.
Relative distributions, change in Gini coefficients, and polarization measures, US 1974–2000 and UK 1969–99



income distribution – owing to job-skill mismatches, autonomous technological changes, or winner-take-all markets, the story of rising inequality has in fact been one of polarization – households in both countries have shifted away from the middle and toward the top and the bottom.

The value of the MRP is considerably larger in the UK than it is in the US, meaning that polarization in the context of rising inequality has been more extreme in the UK. The US and UK are also quite different in terms of the contribution of the upper and lower tails to the phenomenon of polarization. In the UK, the lower polarization index (LRP) is larger than the upper polarization index (URP). This means that polarization in the UK was driven more by 'downgrading' – defined as the movement of households into the lower tail of the income distribution – than it was by upgrading. Specifically, as one can note, such downgrading was defined by movement to the 1st decile in the UK. In the US, polarization occurred in a rather different fashion, with upgrading taking precedence over downgrading.

These findings are extremely interesting in light of the fashion in which

the recent inequality experience of the US is often framed relative to that of other core societies. For instance, in a move typical of the comparative literature on the advanced industrial societies, Esping-Andersen (2001 [1999]: 838) identifies the US as an exemplar of one possible post-industrial future, which he characterizes as a 'Latin American' scenario of a 'narrow, hyper-serviced elite being waited upon by a mass of impoverished servants.' He contrasts this with the Continental experience of 'jobless growth' and growing social exclusion (rising unemployment). If the former is in fact indicated by the inequality experience of either country, this stark vision of post-industrial society actually best applies, not to the US, but to the UK. Also interesting in this regard is the fact that it is the US pattern that is the common one among core countries that have experienced the most substantial increases in inequality. Appendix A reproduces the lower panels of Figure 4 for all 16 core societies in the LIS data set (Appendix B1–B4 reproduces the entirety of Figure 4). In Appendix A, societies are ranked from left to right in terms of the magnitude of the change in their Gini coefficients. As one can note, in broad outlines, we observe the same pattern of distributional change that we see in the US in countries as diverse as Austria, Finland, Australia, and Luxembourg: rising inequality has been accompanied by a process of polarization in which upgrading has taken precedence over downgrading. Indeed, the pattern we observe in the UK is unique. We do not find it in any other core society.

Among societies that have experienced the largest increases in inequality, then, rising inequality has been expressed in polarization, rather than upgrading or downgrading alone and, in most, upgrading has taken precedence over downgrading in the course of such polarization. What of the remaining core societies? Consider first that handful of societies that have experienced more modest changes, positive or negative, in inequality as measured by the Gini coefficient – the societies, say, arrayed from left to right from Norway through to the Netherlands in Appendix A. The experience of these societies is clearly more heterogeneous. In Norway, the rise in the Gini coefficient across the 1979–2000 period is not expressed in a polarized relative distribution. Instead, the MRP is negative, indicating, by the metric of Handcock and Morris's (1999) measure, convergence toward the center of the distribution – a clear illustration of the fact that rising inequality does not necessarily entail polarization. In Belgium, Switzerland, and Denmark, increases in the Gini coefficient over the time periods allowed by the LIS data are associated with a positive URP and, in the cases of Switzerland and Denmark, a negative LRP. This indicates that the upturn in the Gini coefficient in these countries is nearly wholly associated with upgrading, specifically, with the relative growth of the 10th decile (see Appendix B3). Germany, France, and the Netherlands all experienced modest declines in inequality across the available periods. In Germany, this was driven by convergence from bottom tail to the center of the distribution. France experienced a similar pattern, as indicated by the negative LRP, but this was offset by

the positive URP, attributable to the relative growth of the 10th decile. In the Netherlands, in contrast, declining inequality is associated with a positive LRP and a negative URP, attributable to the relative growth of the 1st decile and decline of the 10th.

The final two societies in Appendix A, Canada and Sweden, are particularly interesting cases. Inequality in both societies has declined, and declined measurably, with the Gini coefficient in Canada declining from 0.332 to 0.305 from 1971 to 2000 and, in Sweden, from 0.282 to 0.250 from 1967 to 2000. Relative to 1971 and 1967, exactly how did the distribution of income change to make these societies more equal by 2000? As is nicely illustrated in Appendix B4, declining inequality in both countries was the result of genuine convergence, of the redistribution of households from both tails of the distribution to the center. Also, as is indicated by the relative size of the LRP and URP in Canada and Sweden, the shift from the lower tail to the middle was more important in this process than the shift from the upper tail to the middle. It is worth noting that these changes conceal periods of even lower inequality in the intervening years. When we examine the relative distributions for the years in which inequality reached a low point in the available series – 1991 in Canada and 1981 in Sweden – the pattern we observe in 2000 is even more pronounced. The experience of the US in a period of declining income inequality provides a notable contrast. Using data on the distribution of family income, Alderson and Nielsen (2000) calculate relative distributions for 1960 and 1970 using 1950 as the baseline year. As in Canada and Sweden, they find that the decline in inequality in the US across the 1950–70 period was associated with a clear pattern of convergence from the tails, but they find that movement from the upper tail to the center of the distribution made a larger contribution to such convergence than movement from the lower tail to the center. Remarkably, then, it appears that the 'end' of the Kuznets curve (i.e. the conclusion of the period of declining inequality that core societies enjoyed in the 20th century) involved considerably more 'leveling' of the top in the US than it did in Canada or Sweden – a fact that starkly contradicts typical assumptions and stereotypes.

Conclusions

Eleven of the 16 core countries in the LIS dataset experienced an increase in inequality in recent decades. Exactly how did inequality grow in these societies? Using relative distribution methods to describe patterns of distributional change, we find that rising inequality was attributable to polarization, rather than upgrading or downgrading alone, in most societies. Among those societies that have experienced the largest increases in inequality, upgrading took precedence over downgrading in the course of such polarization. The UK, which experienced the largest increase in inequality of any core society, is an exception to this rule, with downgrading, or movement from the middle to the lower

tail of the distribution being more pronounced than upgrading in the process of polarization. Among the handful of societies that have experienced more modest changes, positive or negative, in their level of inequality, patterns of distributional change are more heterogeneous. In Norway, rising inequality was not accompanied by polarization, while in Belgium, Switzerland, and Denmark rising inequality was almost entirely the result of upgrading or the relative growth of the upper tail of the income distribution. Not all societies have experienced rising inequality in recent decades. Inequality declined most substantially in Sweden, followed by Canada. Declining inequality in both countries was the result of convergence from the tails to the center of the distribution, with the shift from the lower tail to the middle being more pronounced than the shift from the upper tail to the middle in the course of convergence.

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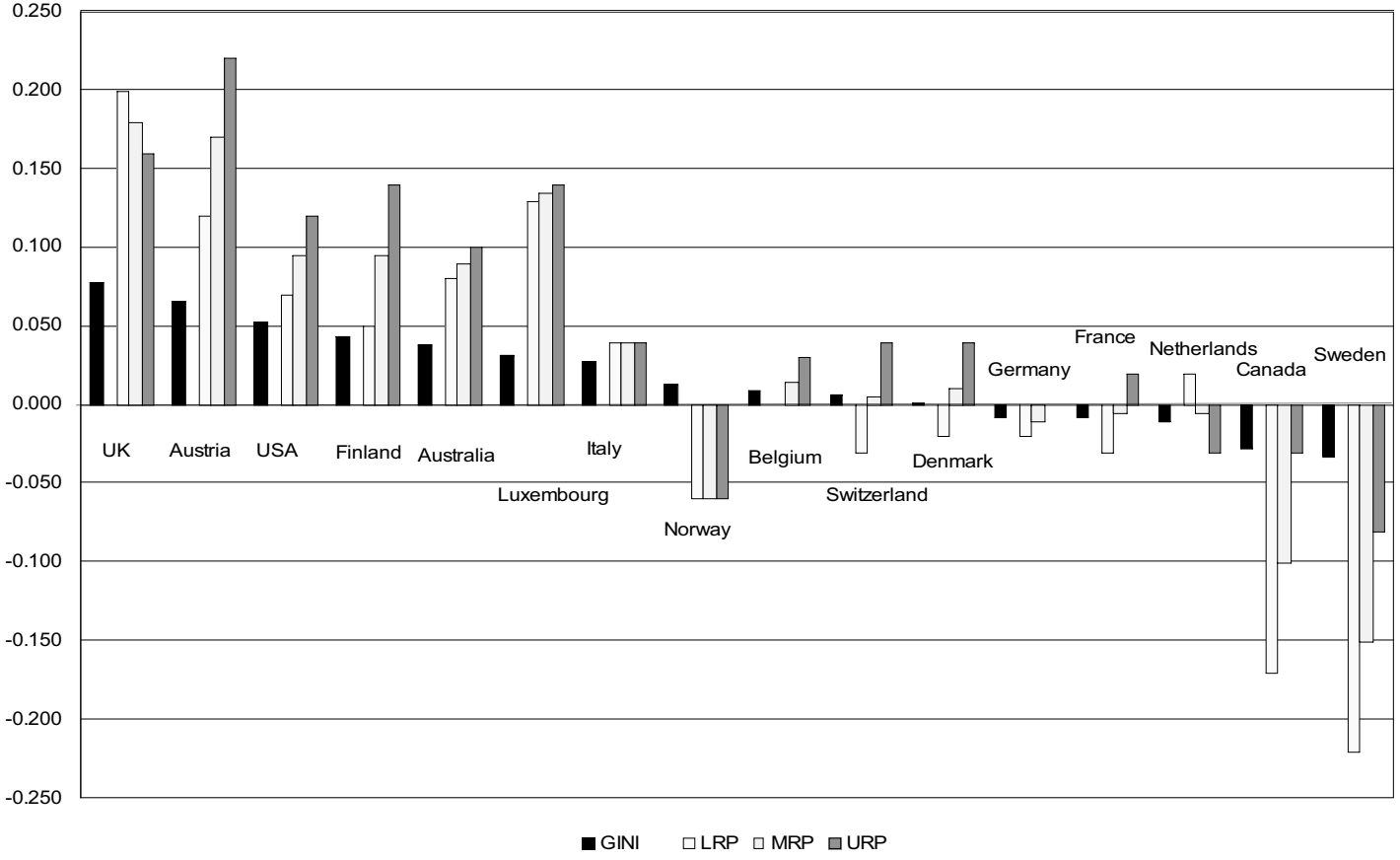
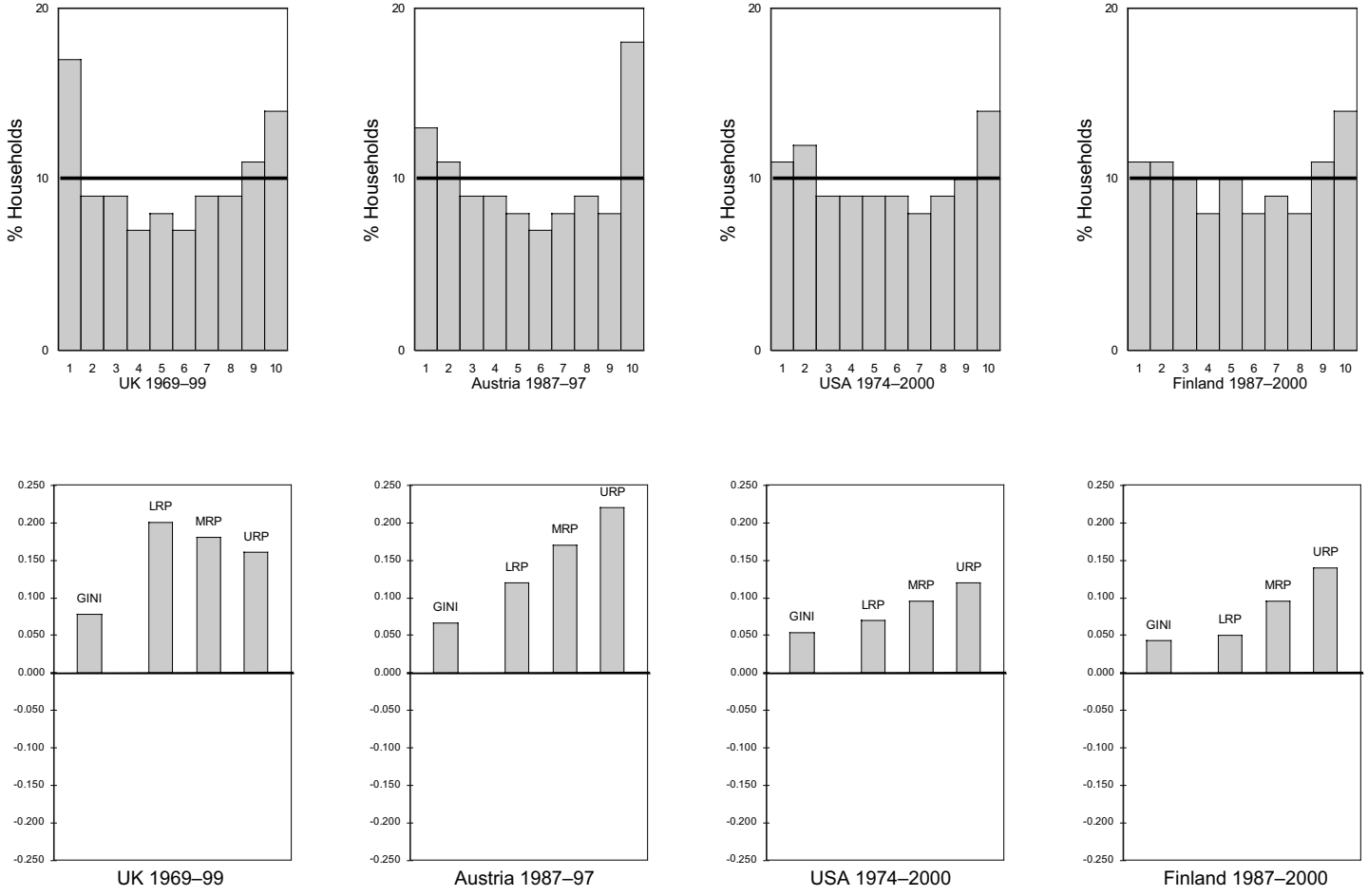
Appendix A.
Change in Gini coefficients and polarization indices in 16 core societies, various periods

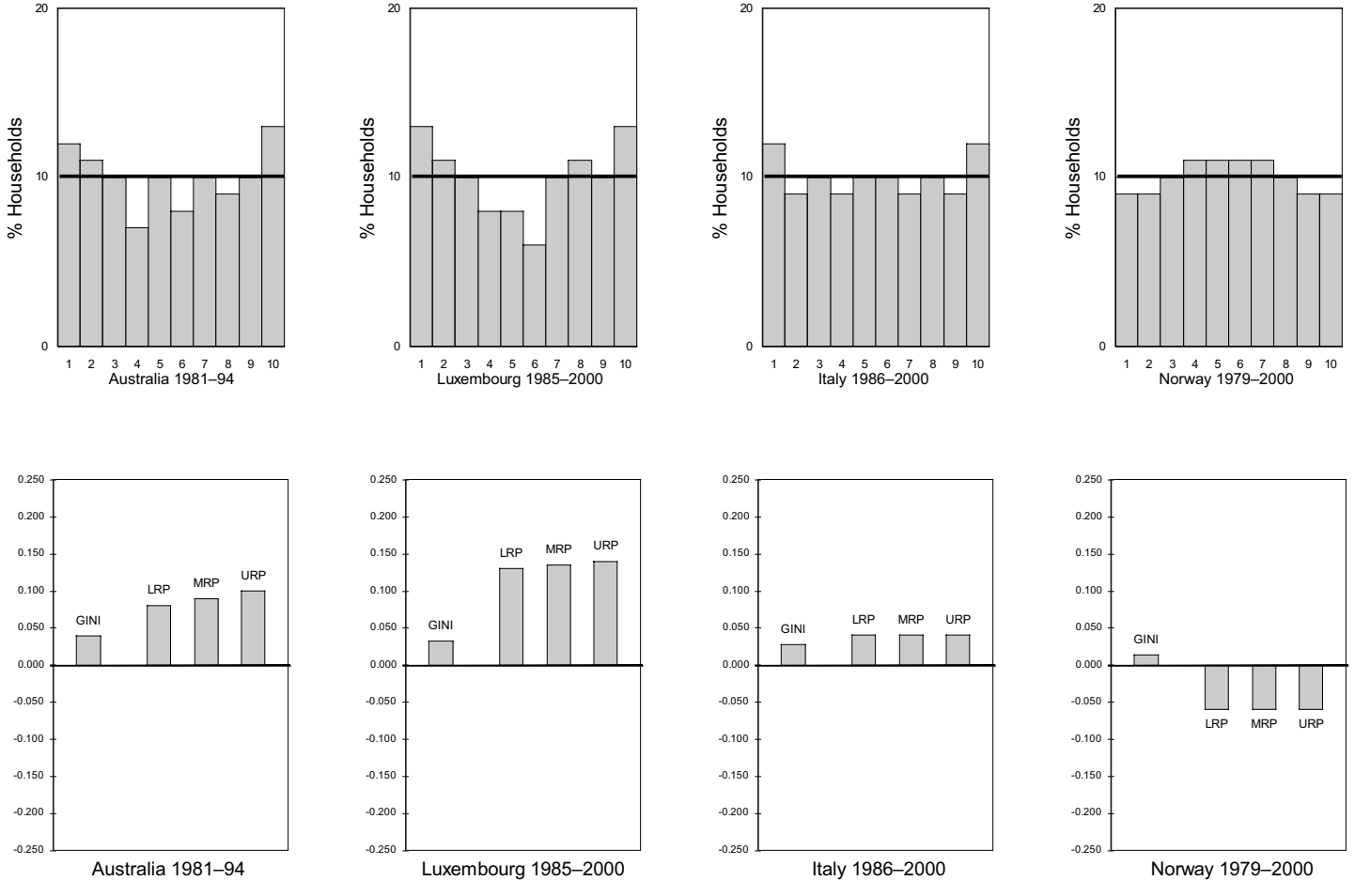


Note: Ranked from left to right in terms of the magnitude of change in Gini coefficient (GINI). LRP = Lower relative polarization index. MRP = Median relative polarization index. URP = Upper relative polarization index.

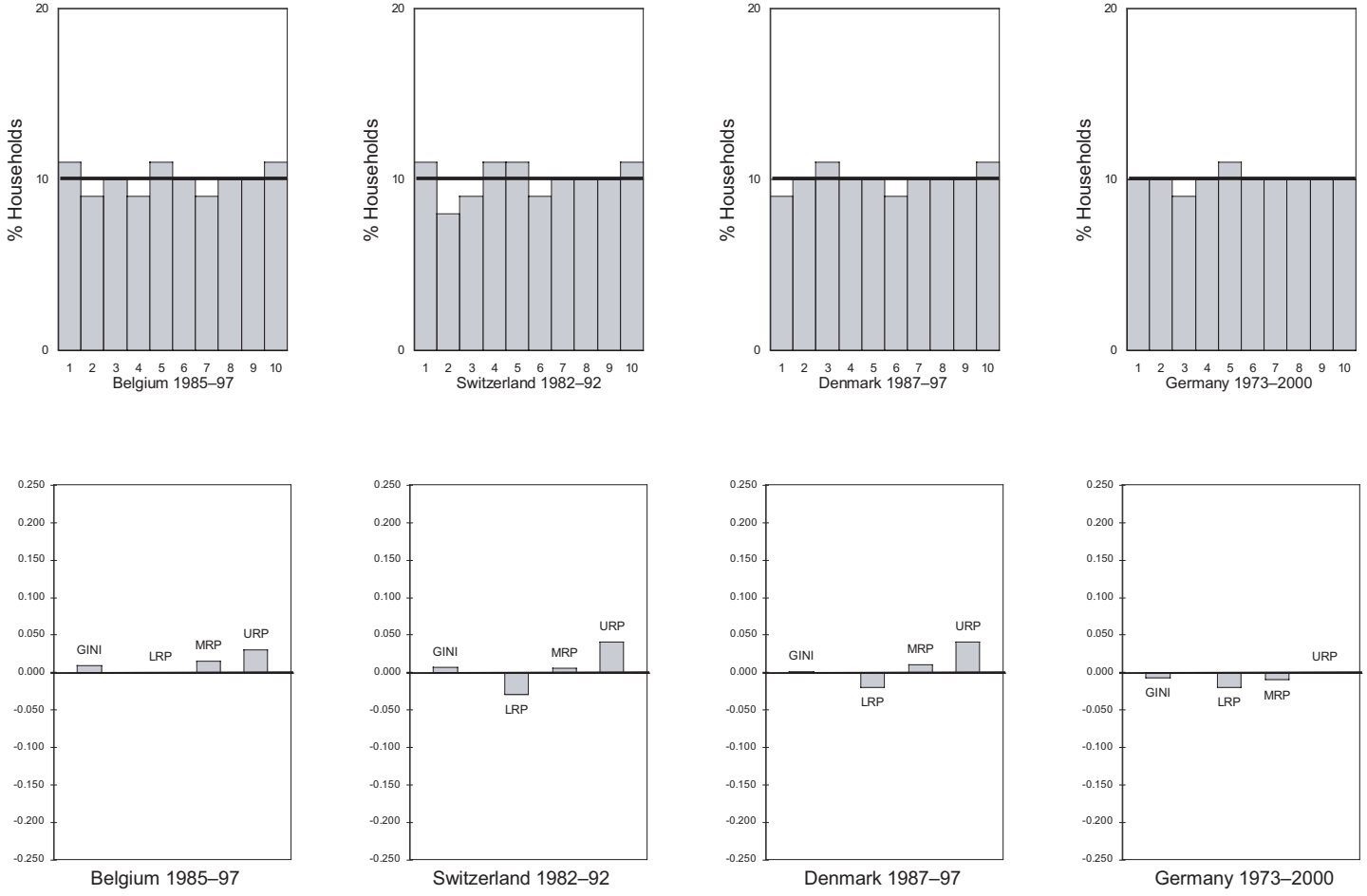
Appendix B1.
Relative distributions (top) and summary inequality and polarization measures (bottom)



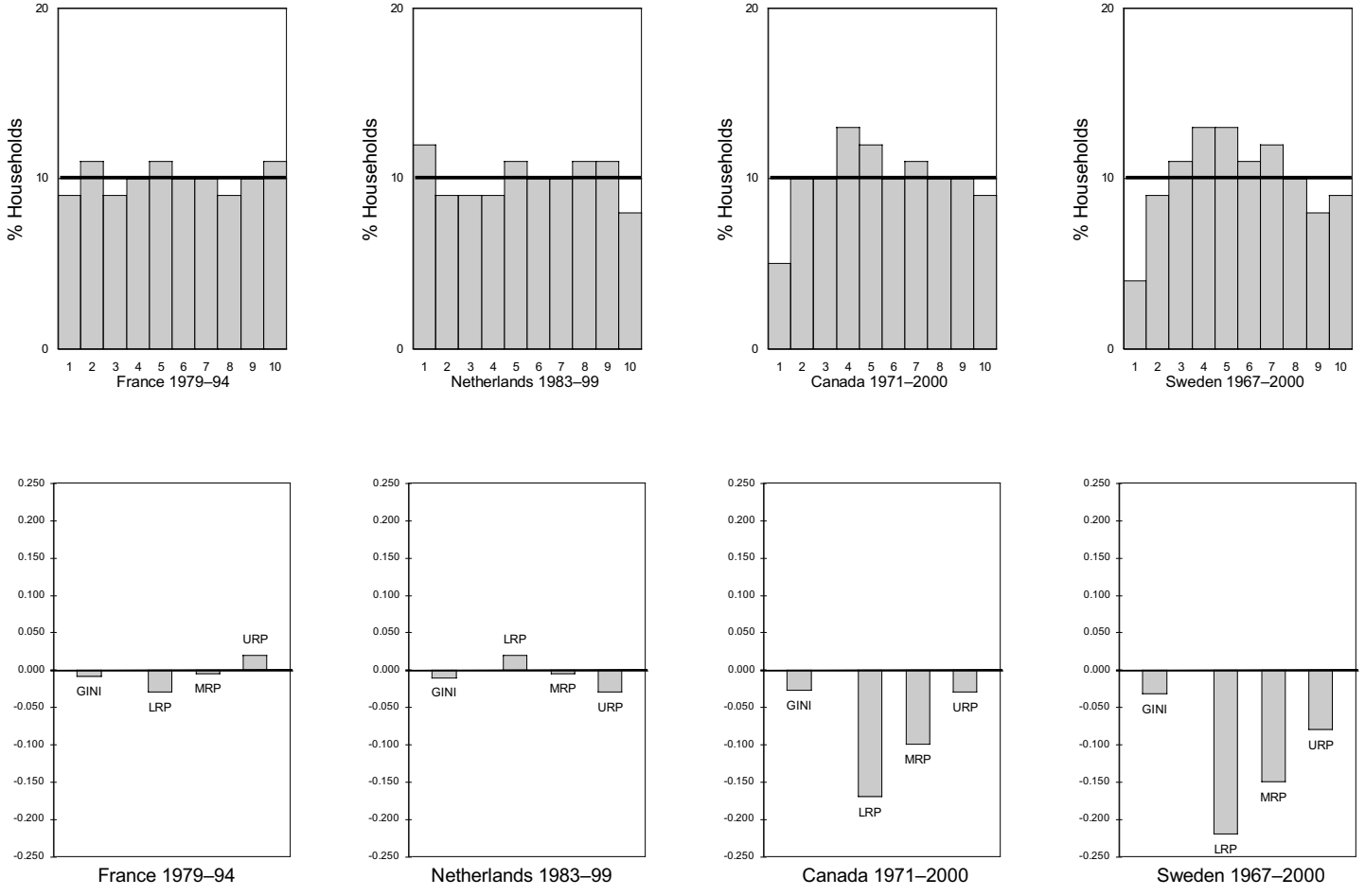
Appendix B2.
Relative distributions (top) and summary inequality and polarization measures (bottom)



Appendix B3.
Relative distributions (top) and summary inequality and polarization measures (bottom)



Appendix B4.
Relative distributions (top) and summary inequality and polarization measures (bottom)



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