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The Convergence of the Middle Class. New Evidence for Europe[*]

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Abstract

We analyse how the size of the middle class has evolved in 26 European countries between 2004 and 2013. With data from the European Survey on Income and Living Conditions (EU-SILC), we define households with a median equivalised disposable household income between 75% and 125% to be middle class. We find that in 16 out of 26 countries the middle class decreases and identify an increase in income polarization in all these countries, with the exception of Greece. We examine whether changes regarding the middle class can be attributed to changing household structure, unemployment rates or redistributive policies. Our results suggest that redistributive policies are most influential for explaining the change across country groups, whereas the other factors do not seem to have an impact. However, there is a great variation between countries. Due to government transfers and taxes, middle class increased 17 percentage points in Iceland, while only by 5.3 percentage points in Estonia. Exploring potential explanations for this gap, we define country groups with similar socio-economic policies and institutions. We observe that Social-Democratic countries and Central European economies have the biggest, while Baltic and Mediterranean countries show the smallest middle class. Analysing the impact of redistributive policies we find considerable differences between country groups and can show that liberal market economies do most, whereas Baltic countries do least for their middle class.

JEL Classification: D31, D63, P51
Keywords: Middle class, Polarization, EU-SILC, Institutional settings

1 Introduction

The aftermath of the financial crisis in 2007 has increased the interest in income and wealth inequality, as well as the concern about the *hollowing out of the middle class*. Moreover, the well-being of the middle class was part of the latest election campaigns in Europe and the United States. Therefore, this paper will analyse how the size of the middle class has evolved in 26 European countries between 2004 and 2013. An extensive literature exists, where numerous studies find a declining middle class.[1] The *hollowing out of the middle class* is associated with a more polarized income distribution, as proposed by Foster and Wolfson (2010). Hence, when there are more lower- and/or upper-income class households and consequently fewer middle class households. Additionally, the concept of *hollowing out* can also encompass a declining income share of the middle class. According to Thewissen et al. (2015), the ongoing debate not merely lies within the realm of scientific research, but has extended to the political sphere. There, the focus lies on the lack of improved living standard for the middle strata, as well as on stagnating real incomes in recent decades. The authors further mention the decline of opportunities, increased insecurity of the middle class and lack of prosperity for their children.

Scholars and politicians have pointed out the importance of a stable and large middle class. Birdsall et al. (2000, 1) consider the middle class as "the backbone of both the market economy and of democracy in most advanced countries". Furthermore, Thewissen et al. (2015) stress the positive effect on the aggregate demand and the importance for investments on education and skills of the middle class. Moreover, it has been argued by Rajan (2011) and Reich (2010) that growing income inequality fuels household debt when lower and middle income households try to smooth their consumption in times of income fluctuations leading to greater financial instability.[2] The idea that a strong middle class is also vital for democracy and social cohesion is not a new one, it was already put forward by Aristotle (1932).[3] He emphasises that political communities administered by a numerous and strong middle class are favorable over a rule by either one of the two extremes - rule by the poor (extreme democracy) or rule by the rich (oligarchy). More recently, Barro (1999) finds that democracy increases with the share of middle-class income. Fukuyama (2012) raises the question in his essay, whether liberal democracy can survive the decline of the middle class. He postulates that liberal democracy rests on a middle-class social base, which is being eroded by the current form of globalized capitalism.

Thus, based on the outlined considerations it is worthwhile to carefully study the develop-

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[1]For single country analyses see, e.g., Blackburn and Bloom (1985), Rosenthal (1985), Bradbury et al. (1986), Horrigan and Haugen (1988), Jenkins (1995), Grabka and Frick (2008) or Grabka et al. (2016) For cross-country analysis see, e.g., or Deininger and Squire (1996), Pressman (2007), Foster and Wolfson (2010), Kharas (2010), Ravallion (2010) or Bigot et al. (2012).

[2]"In both eras [1920s and 2000s], had the share going to middle class not fallen, middle-class consumers would not have needed to go as deeply into debt in order to sustain their middle-class lifestyle. Had the rich received a smaller share, they would not have bid up the prices of speculative assets so high" (Reich, 2010, 25)

[3]See: Book IV, IX. 6- 8

ment of the middle class in Europe. With this paper we contribute to the current debate in several important ways. First, we show how the middle class evolved in Europe between 2004 and 2013 on a country basis. Second, we study to what extent the income distribution became more polarized across Europe by means of a polarization index, that was proposed by Wolfson (1994). In their recent paper, Alichi et al. (2016) who examine income polarization in the United States, emphasize that it is of great importance to study and compute the polarization index also for other countries. Third, we deal with drivers of a changing middle class based on a framework proposed by Pressman (2007), who analysed the decline of the middle class investigating structural, macroeconomic and fiscal factors in 11 developed countries between 1980 and 2000. Last, we illustrate potential causes for the change in middle class by focussing on variations across different welfare state regimes. To examine these issues, we use household income data from the European Survey on Income and Living Conditions (EU-SILC) for 26 European countries between 2004 and 2013. In this paper, we define the middle class as households receiving an income between 75% and 125% of the median equivalised disposable household income.

Our results underline the findings of Pressman (2007). We show that redistributive policy is the most important driver for the size of the middle class. The influence of redistributive policy on the middle class varies significantly between countries and increased its size between 17 percentage points in Iceland and 5.3 percentage points in Estonia. To explain this gap we cluster countries into groups with similar socio-economic policies and institutions. Using an approach provided by Aristei and Perugini (2015) to cluster countries with respect to similar socio-economic policies and institutions, we find that Social-Democratic countries and Central European economies have the biggest middle class, whereas the smallest middle class is found in Baltic and Mediterranean countries. However, the institutional influence tends to get weaker and a convergence of the size of the middle class across Europe is found in the data. This is revealed by the decline in the range of the size of the middle class between country groups, which declined from 13.2 percentage points in 2004 to 10.9 percentage points in 2013. Furthermore, we observe that the effect of governmental redistribution on the size of the middle class is significantly weaker when considering only household heads younger than 60 years old. Thus, we see that most of governmental redistribution is due to social security and retirement programs for the elderly.

The remainder of the paper is organized as follows. In section 2 we outline the difficulties of measuring the middle class. Section 3 describes our data. Our results are discussed in section 4, which is divided into three subsections. First, we give an overview about the development of the middle class at the European level. In this section we show how many European countries have experienced a declining middle class and whether there was upward or downward mobility. In addition, we present the application of the polarization index. We examine the M-curves, first and second polarization curves of each country according to Foster and Wolfson (2010) to ensure that our findings are also valid when other middle class thresholds are

chosen. Second, we analyse the effect of changing household structure, unemployment rates and redistributive policy on the size of the middle class. We further examine to what extent government social security and retirement programs for the elderly alter the size of the middle class. Third, we present the size and income share of the middle class, as well as the development of income polarization on a country group level. Moreover, we compare income polarization and income inequality trends across Europe in recent years. Finally, section 5 summarizes our main findings.

2   Measuring the middle class

Among economists, the middle class is usually defined in terms of income. Economists, as pointed out by Gornick and Jäntti (2014) study those who belong to the middle of the income distribution, rather than a class in sociological terms.[4] Nevertheless, it would be a neglect to underrate the significance of wealth when studying the middle class. Fessler and Schürz (2017) point out that it is pivotal to differentiate between middle-class households, which enjoy securities by means of their own wealth and those which have to rely on the welfare state. In this paper, due to data constraints, we exclusively refer to the middle income class, when talking about the middle class. Various measurement approaches can be useful in different contexts. The size of the middle class can be either fixed or varying. When taking the size of the middle class as fixed, scholars study for instance the three middle quintiles (Easterly, 2001) or the middle 60 percent (Atkinson and Brandolini, 2013). According to this measurement, the size of the middle class cannot - by definition - change over time. Since we focus on the changing size of the middle class, we use thresholds for defining our subject of interest. Income thresholds can be either in absolute or relative terms. For developing countries, an absolute income measure is commonly used to define poverty, as well as the middle class. For instance, Banerjee and Duflo (2008) define the middle class for developing countries as people living on between $2 and $10 a day. Another approach for identifying the middle class in developing countries is to study the consumption behaviours of individuals or households instead of income. Ravallion (2010) argues that for high-income countries, definitions are generally based on relative income, typically referring to the median equivalised income of a country. Owing to the fact that the size of the middle class in European countries lies at the core of our research, we use a relative income definition for the middle class. Defining the middle class in relative terms leads us to the problematic issue of defining

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[4]Other disciplines typically go beyond a definition solely based on income. Grabka et al. (2016) mention other socio-economic factors, such as education, social and occupational status, family background, social networks, leisure behaviour or values can be included in defining an income class. According to Burzan (2012) the society can be divided along vertical inequalities, such as occupation, education and income, as well as horizontal inequalities, such as gender, age, ethnicity, residential area, lifestyle and values. Moreover, Piketty (2014) defines the middle class as 40% of the households above the median wealth (P50-P90). Fessler and Schürz (2017) examine the middle class in Austria according to definitions based on income, consumption and wealth. The authors find that only 26.6% of households belong to the middle 60% regardless of the definition (equivalised net income, equivalised consumption or net wealth).

lower and upper thresholds. Once more, there is a lack of consensus on which thresholds should be used. A wide variety of definitions exist: Grabka and Frick (2008) and Bigot et al. (2012) define the middle class as households with an equivalised income between 70% and 150% of the national median income. Other studies, such as Blackburn and Bloom (1985) and Pew-Research-Center (2015) broadened the definition to 60-225% and 67-200%, respectively. Bosch and Kalina (2015) and Simonazzi and Barbieri (2016) chose cut-off points of 60% and 200%. Again other scholars study households with an income between 75% and 125%, when talking about the middle class (Birdsall et al., 2000; Pressman, 2007; Thurow, 1987). The enumeration should highlight the great variation in the literature and the difficulty to choose thresholds. Nonetheless, according to Ravallion (2010) the literature seems to ”converge“ to a definition introduced by the seminal work of Thurow (1987), who defines the middle class between 75% and 125% of the median income. For this research, we decided to follow the literature and define the middle class as households living on between 75% and 125% of the national median equivalised income. As opposed to defining the lower threshold at 60% of the median, we add a margin of a quarter of the at-risk-of-poverty rate. Thus, with a lower threshold of 75% we imply that the middle class is not at immediate risk-of-income-poverty (Atkinson and Brandolini, 2013). The chosen thresholds permit us to examine the middle of the income distribution, bearing in mind its inevitable arbitrariness. In section 4.1.2 we control for our choice of thresholds, by computing M-curves, polarization curves and a polarization index. We find that our findings considering the decline/increase of the middle class are consistent with the results from the polarization index, with the exception of one country.

3 Data

We use micro-level cross-sectional data for 26 European countries provided by the EU-SILC between 2004 and 2013.[5] Our main variable of interest is the equivalised disposable household income using the OECD-modified scale, which assumes scale effects in the living standard. The scale was first proposed by Hagenaars et al. (1994) and assigns a value of 1 to the first adult in the household, 0.5 to each additional adult member, and 0.3 to each child aged under 14 (OECD, 2013). Following Aristei and Perugini (2015), we assume that households are the pivotal dimension where decisions of household members such as parenthood, labor supply, or education are interdependently taken. Therefore, the adoption of a household perspective provides a richer informative set than an individual one. If not stated otherwise, we use disposable income, as defined by Eurostat (2014) to examine the share of middle-class households. Equivalised disposable income is the total gross household income, diminished by income tax, social insurance contributions, regular wealth tax and regular inter-household cash transfer paid after tax. The Canberra Group (UNECE, 2011) emphasizes that disposable income is the preferred variable when analyzing income distribution since it covers the income

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[5]For the total sample, we changed negative incomes to Zero in 4,634 cases.

available for a household to consume and save.[6] When studying the effect of redistributive policy, we additionally examine the size of the middle class before taxes and transfers. This measure is based on equivalised factor income, which comprises gross market incomes, gross capital incomes, gross old-age benefits and gross unemployment benefits.

To analyse the influence of changing household composition on the size of the middle class, we use an approach first introduced by Fessler et al. (2014). This approach uses household strings, which take the household size, age, and gender (for adults) of up to four household members into account.[7] Each household members obtains a two-digit age-gender cell. First, all household members are arranged by descending age and divided into one of four age groups (1: below 16, 2: 16 - 24, 3: 35 - 64, 4: above 64). Second the gender cells are attributed (1 for male, 2 for female and 3 for children). Last, the age-gender cells of each member are added together to obtain the household string.[8] Although the use of EU-SILC data offers many advantages, such as comparability among European countries, it is worth mentioning that in-kind benefits are not included. These benefits provided by the government, including child care, health, education, etc. vary substantially and have an important distributional impact across Europe. Aaberge et al. (2013) observe that estimated income inequality and the estimated share of people at-risk-of-poverty is significantly smaller when replacing disposable cash income with extended income (i.e. including early childhood education and care, education, health care and long-term care). Owing to these findings, we presume that a different picture concerning the share of middle-class households across Europe would emerge when taking in-kinds benefits as extended income into account.

In order to examine the impact of redistributive policy on the size of the middle class in section 4.3, we use an approach provided by Aristei and Perugini (2015) to cluster countries into six groups (see Table A.1). We assume that countries within a group show similar socio-economic policies and institutions, which enables us to take the institutional dimension of the size of the middle class into account. The framework of Aristei and Perugini (2015) is based on the Variety of Capitalism approach, which was initiated by Hall and Soskice (2001), who distinguish countries between liberal and coordinated market economies. To consider a broader institutional dimension, this approach is widened by the literature of Coates (2000) and Amable (2003). Furthermore, the framework embeds literature on post-socialist states and includes institutional factors.[9]

— Table A.1 about here —

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[6]Additionally, consumption can also be financed by a reduction of net worth and taking out loans.

[7]However, for analysing the impact of government social security and retirement programs for the elderly in section 4.2.4 we define household heads. The household head is defined as the person with the highest income of at least 18 years of age. When two household members have the same income, the oldest person is chosen to be the household head.

[8]For instance, a household consisting of one male (36), one female (33) and two children (9 and 11) have the following household string: [312231313].

[9]See, e.g., Nölke and Vliegenthart (2009), Lane (2007), Bohle and Greskovits (2007), and Drahokoupil et al. (2008).

4 Results

4.1 The development of the middle class: a European comparison

4.1.1 The size of the middle class and mobility

We start our analysis by examining whether a decline of the middle class in Europe can be observed in the data. Thus, we calculate the middle class by using equivalised disposable household income. Table A.2 shows the share of the middle class in each country, including the European average (weighted[10] and unweighted) for 2004 and 2013. Furthermore, we show the absolute change during this time period in percentage points. It is evident that the size of the middle class varies considerably across Europe. In 2004, on average (weighted) 38.8% of households could be considered middle class in their respective countries. Turning to 2013, on average (weighted) a small decline between 2004 and 2013 of 0.9 percentage points can be noted. The share of middle income households decreased in 16 countries, whereas it increased in 10 countries. Ireland experiences the most substantial rise, with 6.7 percentage points. The increase in the other countries ranged from 0.3 (Italy) up to 3.1 percentage points (Iceland). Conversely, the largest decline of the middle class is observed in Germany (8.6 percentage points) followed by Sweden (6.7 percentage points) and Estonia (5.4 percentage points). We notice significant differences regarding the size of the middle class among the observed countries. The middle class ranges from around one third (Cyprus, Greece, Spain, Ireland, Italy, Lithuania, Latvia, Poland, Portugal and United Kingdom) up to almost one half (Czech Republic, Iceland, Norway and Slovakia) in 2013.

— Table A.2 about here —

Further, we examine whether the lower income class increases more than the upper income class (downward mobility) or vice versa (upward mobility), when the middle class declines. Thus, we compute an indicator by dividing the absolute change of the upper class through the change of the lower class, $\frac{\Delta upperclass}{\Delta lowerclass}$. If the middle class is declining and the indicator is greater than one, we observe upward mobility whereas downward mobility occurs if the indicator is smaller than one (the same notion in reverse order applies to an increasing middle class). This is done by analysing the changes in households with an equivalised household income above 125% (upper income class) and below 75% (lower income class) of the median. The results are shown in Table A.3 and suggest upward mobility in 14 out of 26 countries. In 16 countries where a decline in the middle class could be noted, nine showed upward and seven downward mobility. In Belgium, for example, the upper class increased by 1.66 percentage points, whereas its lower class grew by 0.55 percentage points. As the middle class declines and the ratio between Δ upper class and Δ lower class returns a value of 3.02, Belgium faces upward mobility. However, we cannot conclude an unequivocal trend of upward and downward mobility regarding a downsizing of the middle class.

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[10]Accounting for the country's population size

— Table A.3 about here —

As a next step, we analyse what happens in the 10 countries, where the middle class increased. Analysing Table A.3, we see that in 5 out of those 10 countries, the middle class received a larger share from the income bottom than from the top. Consequently, the opposite is true for the remaining countries. The results can be found in Table A.4, which summarises our findings by clustering the analysed countries into 4 different groups.

— Table A.4 about here —

4.1.2 Income polarization and the middle class

As discussed in section 2, the choice of lower and upper limits of the middle class is largely arbitrary. Atkinson and Brandolini (2013) show that changes regarding the size of the middle class can vary, depending on which cut-offs are applied. In order to validate our findings concerning the evolution of the middle class, we conduct a robustness check by looking at M- and polarization curves, as well as by computing a polarization index based on Wolfson (1994).

We start by computing M-curves, which is a measurement of the mass around the median income. M-curves allow us to examine whether an income distribution has a larger middle class than another one, irrespective of the chosen cut-off points. When the M-curve of period 1 always lies above the M-curve of period 2, it follows that the middle class is unambiguously larger in period 1 than in period 2, no matter which thresholds are chosen to define the middle class. Figure A.1 shows the M-curve for Germany. One can clearly see that the M-curve of 2004 lies above the M-curve of 2013, indicating that the middle class of 2013 is unambiguously smaller in comparison to 9 years earlier. No such straightforward conclusions can be inferred when the M-curves cross. However, if crossings occur, it is useful to examine the location of crossings. For our purpose, we do not consider it to be problematic when the M-curves cross below 0.6 of the normalized income, which translates into the poverty line of below 60% of the median income. This argument lies on the premise that those living below the poverty threshold are not categorized as middle class.[11] Additional two lines are demarcated at 0.8 and 1.2 in Figure A.1. Since the most narrow definition of the middle class determine the cut-off points at 80% and 120% of the median income[12], any crossings between the two lines are negligible. When the curves lie on top of each other or slightly above each other in one half, it is pivotal to look at the other half to examine whether the middle class unambiguously increases or decreases. We find that in our sample, the middle class of 2013 compared to 2004 is unambiguously smaller in 9 countries (Austria, Germany, Denmark, Estonia, Finland, Hungary, Luxembourg, Sweden and Slovenia). The middle class unambiguously increased in

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[11]Cf. Ravallion (2010)

[12]Bosch and Kalina (2015) differentiate between the lower (60% - <80%), middle (80% - <120%) and upper (120% - <200%) middle class

5 countries (Czech Republic, Iceland, Poland, Portugal and United Kingdom). No such statement can be made in the case of the remaining 12 countries, due to the fact that the M-curves of the two years cross.

One possible cause of a declining middle class can be a rise in income polarization. A more polarized income distribution can be attributed to two trends: increased spread and/or increased bipolarity. An increased spread occurs when the rich become richer, whilst the poor become poorer. The income distribution can also get more polarized by becoming more bipolar, i.e. when the poles become more defined. The first degree of polarization measures the spread, which is linked to the M-curves. The spread measures the length of the median normalized income space related to a given middle-class population range. For instance, when examining the middle 60%, the spread is computed by subtracting the normalized income of the household at the 20th percentile from the normalized income of the household at the 80th percentile. There is an increase of polarization when a larger income spread is needed in order to capture a predefined population range (in our example, the middle 60%). Thus, fewer persons/households are located around the median. We can conclude that income distribution in period 1 has an unambiguously smaller spread, when the first degree polarization curve of period 1 is always located below the curve of period 2 and the curves do not cross. A smaller spread translates into a higher concentration of incomes near the middle and thus a larger middle class. Figure A.1 depicts the first polarization curves for Germany in 2004 and 2013. The polarization curves confirm our findings from the M-curves. The first polarization curve of 2013 is always above the one of 2004. Consequently, the spread in 2013 is unambiguously larger than in 2004, indicating a smaller middle class in 2013 for any cut-off points. Figure A.1 further shows the example for the most narrow definition of 80% up to 120%, which translates into a spread of 0.2 from the normalized median income. It is evident from the figure, that the size of the middle class decreased in Germany. Again, one has to be careful if and where curves cross. In Europe, the spread unambiguously increased in 9 and decreased in 5 countries. The curves cross in 12 countries, making it impossible to come to an unambiguous conclusion.

The income distribution can also become more polarized when bipolarity increases. This is measured by the second degree polarization curve, which is the area under the first degree polarization curve. Both polarization curves account for an increased spread, whereas the second degree polarization curve additionally is sensitive to bipolarity. To derive the second degree polarization curves, income spreads from the middle to the top and from the middle to the bottom are accumulated. The curve provides insights on the average distance to the median for every middle class in any income distribution. When the second degree polarization curve of period 1 is located below the curve of period 2, then the income distribution of period 1 is less polarized than in period 2. The example of Germany in Figure A.1 provides evidence that the income distribution of 2013 is unambiguously more polarized than in 2004. The income distributions across Europe became unambiguously more polarized in 11

countries, whereas income polarization unambiguously decreased in 7 European countries. For the remaining countries, no such conclusions can be derived, because the second degree polarization curves cross.

The specific case of Greece has to be emphasized: first, it is worth pointing out that due to the economic crisis the equivalised disposable median income decreased by 14.8% nominally and by 32.2% in real terms between 2004 and 2013.[13] Second, the M-curves show that in the lower half of the income distribution, the curve of 2004 lies above the one of 2013. The contrary is true for the upper half of the income distribution. Thus, the lower middle class decreased, whereas the upper middle class increased. This can be also seen in the first and second polarization curve, where the spread and cumulative spread is greater in 2013 for the bottom 50% but smaller for the top 50%.

— Figure A.1 about here —

In addition, we measure income polarization with an index of income polarization provided by Wolfson (1994), which is 4 times the area beneath the second-degree polarization curve:

$$P = 4 * \left(0.5 - \text{Income Share of Bottom 50\%} - \frac{\text{Gini Coefficient}}{2} \right) * \left(\frac{\text{Mean income}}{\text{Median income}} \right)$$

The polarization index ranges from 0 (no polarity) to 100 (bipolarity) and allows us to rank income polarization across countries and time. A higher polarization index is associated with a smaller middle class. It is worth pointing out that the polarization index does not indicate whether any crossings of the polarization curves occur.[14] Consequently, it may well be the case that although the polarization index increases, the middle class of the first period is not unambiguously smaller than the one from the second period. In Europe, the income polarization increased from 2004 to 2013 in 15 countries and decreased in 11 countries, as shown in Table A.9. A rise of the polarization index is accompanied by a downsizing of the middle class (defined as 75% - 125% of the disposable equivalised median income) and vice versa, with Greece being the only exception. In Greece the polarization index decreased as well as the size of the middle class.

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[13]Nominal equivalised disposable median increased in all other countries, except for Iceland, which experienced a decline of the median income by 5.6%. In real terms, the median also decreased in Cyprus (-8.3%), Hungary (-11.6%), Ireland (-4.2%), Iceland (-47.0%), Italy (-7.0%), Luxembourg (-3.5%), Portugal (-0.8%) and United Kingdom (-12.8%).

[14]Similarly, the Gini index does not provide any information, whether the Lorenz curves of two distributions cross.

4.2 The drivers of a changing middle class

To identify drivers of a declining middle class, this section analyses the effects of household structure and unemployment rates. Moreover, we will examine the impact of redistributive policy, hence the difference between disposable and factor household income. Last, we will analyse whether the size of the middle class changes substantially when only non-elderly households are taken into account. That specific social-group is of high interest because it allows us to analyse the impact of government social security and retirement programs for the elderly on the size of the middle class.

4.2.1 Household composition

Table A.5 shows the size of the middle class accounting for household type fixed effects. To analyse the effect of changing household composition on the size of the middle class, we standardize the different household structures across countries using an approach introduced by Fessler et al. (2014). This approach considers the number of household members and takes all possible combinations of age and gender into account. We undertake a counterfactual analysis, where we assume that the household composition does not change and is fixed in 2004. Thus, we see how much the middle class would have changed between 2004 and 2013, if we assume that the household composition did not change after 2004. Following Pressman (2007) we first assume that the size of the middle class is the sum of the weighted average of each household type, belonging to the middle class. Based on these weighted averages we then compute the share of the middle class in 2013. We cannot observe what the size of the middle class would have been in 2013 with a constant household composition of 2004, since the household composition changed. Therefore, this analysis is referred to as counterfactual. The counterfactual anaysis shows that, on average, changing household structures do not account for changing middle class share. As can be seen from Table A.5, the weighted average is -0.9 percentage points for the actual and -1 percentage point for the counterfactual change of the size of the middle class. On a country level, we observe the two most significant results in Cyprus and Norway. For the latter we see that with a constant household type composition the middle class would only increase 0.1 percentage point compared to an increase of 0.9 percentage points between 2004 and 2013. Moreover, assuming a constant household type composition shows that the middle class in Cyprus would only decrease by 0.4 percentage points compared to a decrease of 1.3 percentage points. Thus, we see that the increase of the middle class in these countries is largely affected by changes in the household composition.

— Table A.5 about here —

4.2.2 Unemployment rate

One possible macroeconomic channel, which might be responsible for a declining middle class, is rising unemployment. We follow the assumption of Pressman (2007) who argues

that declining unemployment rates lead to more people in employment and higher income. Thus, we assume that if the unemployment rate decreases, more low income households are able to move to the middle class. In Table A.6, the change of the unemployment rate and the middle class can be seen. If macroeconomic factors have an impact on the middle class, we would expect that a rising unemployment rate will lead to a declining size of the middle class, and vice versa. However, the results show little evidence that the unemployment rate affects the size of the middle class. On the aggregate level (weighted), unemployment rose by 1 percentage point, while the middle class decreased by 0.9 percentage points between 2004 and 2013. Moreover, the correlation-coefficient shows no significant correlation between the unemployment rate and the share of middle-class households.

At the country level, in 11 out of 26 countries an increase in the unemployment rate is accompanied with a decrease in the size of the middle class. Merely 4 out of 26 countries show a decline in the unemployment rate and an increase in the size of their middle class. Moreover, one country had no change in the unemployment rate but its middle class decreased. In 4 countries we observe a decline of the unemployment and the middle class at the same time. In the remaining 6 countries the opposite holds true. Hence, we find little evidence that changes in the middle class can be understood by changing unemployment rates.

— Table A.6 about here —

4.2.3   Redistributive policy

To analyse the effect of redistributive policy, we examine the size of the middle class, defined as households with a factor income between 75% and 125% of the median factor income in Table A.7.[15] Looking at the results it can be noted that, as expected, in all countries the middle class would be significantly smaller without governmental redistribution. On average (weighted), the middle class would have been 9.8 percentage points smaller in 2013 based on factor income. Between countries the influence of government spending and taxes on the size of the middle class varies significantly. In Iceland the middle class would have been around 17 percentage points smaller, whereas the difference in Estonia only amounts to 5.3 percentage points. The result shows the vast impact of redistributive policy on the income distribution, size of the middle class and the variation across European countries.

Furthermore, comparing Table A.7 with Table A.2, we see that, in 10 out of 26 countries, redistributive policy mitigated the middle class decline/increase. In Norway, for instance, the middle class rose by 0.9 percentage points after taxes and transfers. The increase based on factor income would have amounted to 3.9 percentage points. Moreover, in Austria, Cyprus and Spain we see that the middle class based on factor income would have shrunk significantly more than based on disposable income.

We would expect that when the middle class based on factor income increases, that the middle

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[15]Factor income comprises gross market incomes, capital incomes, old-age benefits and unemployment benefits.

class based on disposable, also increases. Evidence suggests that this is not always the case. In 6 countries the middle class would have increased in terms of factor income, but decreased with respect to disposable income. For instance, the middle class in Latvia declined by 2.1 percentage points based on disposable income, but increased by 2.2 percentage points based on factor income. In other cases, the rise of the middle class was more pronounced in terms of factor income than in disposable incomes. Still other examples indicate that also the decline can be more visible regarding the disposable income than factor incomes. In Germany, the fall of the middle class amounts to 8.6 percentage points, when the disposable income definition is used, whereas the decline amounts to 6.8 percentage points otherwise. This shows that redistributive policy can affect the evolution of the middle class in a positive but also in a negative way. The significance of redistributive policy should be highlighted. However, no clear direction becomes evident from our data when trying to explain the changing size of the middle class over time. Still, it is worthwhile keeping in mind that taxes and transfers unambiguously increase the share of middle class households.

— Table A.7 about here —

4.2.4 The non-elderly middle class

Table A.8 helps us to establish the significance of government social security and retirement programs for the elderly on the difference between the size of the middle class before and after government interference. Factor income is assumed to be low for the elderly because they are less likely to be in employment. Most elderly persons receive a large share of their income out of government transfers. Owing to this reason, we now only examine the redistributive effects on a subsample for non-elderly persons. Thus, we calculate the middle class based only on households which have household heads younger than 60 years old.

In Table A.8 columns 2, 3 and 4 analyse the development of the non-elderly middle class for disposable income. On average (weighted) the middle class was 38.7% in 2004 and decreased by 2.1 percentage points by 2013. Therefore, when only considering non-elderly households the decline in the middle class is more than twice as much as for the original sample. The most significant decrease of the middle class was similar to the initial sample: Germany (8 percentage points) is followed by Cyprus (6.7 percentage points) and Sweden (6.4 percentage points).

Analysing column 5, 6 and 7 shows the results for non-elderly households when only considering factor income. In 2013, without redistributive policy the non-elderly middle class decreased on average (weighted) by 7 percentage points, which is significantly lower than if we consider all households (9.8 percentage points). Thus, we see that the effect of governmental redistribution is significantly higher when elderly are taken into account.

In 24 out of 26 countries we find that governmental redistribution is lower for non-elderly households than for the overall sample. The most distinct result is obtained for Slovakia,

where the redistributional effect between all households (14.6 percentage points) and non-elderly households (5.8 percentage points) is 8.8 percentage points. Only for Ireland and Sweden we find that redistributional effects are lower when the elderly are included into the analysis. Therefore, we can conclude that governmental social security and retirement programs for the elderly are an important driver for the size of the middle class.

Furthermore, between 2004 and 2013 the non-elderly middle class regarding factor income declined on average (weighted) by around 2.3 percentage points. It shrunk most significantly in Cyprus (11.4 percentage points) and Spain (9.5 percentage points). Moreover, in 14 out of 26 countries, redistributive policy mitigated the middle class decline/increase for non-elderly households. In Sweden redistributive policy had the most negative impact, where the decline of the middle class would have been 0.9 percentage points for factor income but was 6.4 percentage points for disposable income. The other extreme is Ireland, where the middle class would have decreased by 5.7 percentage points by factor income but increased by 0.5 percentage points by disposable income.

— Table A.8 about here —

4.3 Country groups

We established the link between the importance of redistributive policies and the size of the middle class. To find out, which country groups are most effective in supporting prosperous middle class we analyse the influence of welfare state regimes. To do so, we use a framework provided by Aristei and Perugini (2015). We assume that countries within a country group (see Table A.1) exhibit similar socio-economic policies and institutions, which enables us to show which kind of welfare state influences the size of the middle class in a positive/negative way.

4.3.1 The size of the middle class

Figure A.2(a) shows that the size of the middle class (disposable income) varies significantly when clustering countries into country groups. After weighting according to the population size, in 2013 the largest middle class can be observed in the Social-Democratic countries (SDC) and Continental European economies (CEE), whereas the smallest can be observed in the Baltic countries (BC) and Mediterranean countries (MC). The range between the biggest and smallest middle class was reduced from 13.2 percentage points in 2004 to 10.9 percentage points in 2013. Therefore, a clear convergence regarding the size of the middle class can be observed. Redistributive policy still has a significant influence on the size of the middle class, but its effect is beginning to shrink. Moreover, it is interesting that the middle class only increased in the liberal market economies (LME) (2.8 percentage points), whereas in all other country groups the middle class decreased. The most significant decrease can be observed in the SDC (4.2 percentage points).

Analysing the evolution of the middle class based on factor income the picture in Figure A.2(b) is slightly different. In 2013, the biggest middle class can still be found in SDC and CEE, whilst the smallest middle class now can be observed in the LME. Furthermore, the middle class in the MC decreased steadily and shrunk by 3.3 percentage points between 2004 and 2013. However, based on factor income no significant convergence regarding the size of the middle class can be found. The range between the smallest and biggest middle class decreased only 2 percentage points between 2004 and 2013. Similar results are found for the evolution of the middle class based on factor income in Figure A.2(b), except that the smallest middle class now can be observed in the LME.

Figure A.2(c) refers to the impact of redistributive policy on the size of the middle class. Comparing the size of the middle class regarding disposable and factor income, we show the extent to which the middle class changed due to governmental influence. In 2004, redistributive policy was most successful in SDC where the government increased the middle class by 14.6 percentage points. MC performed worst and increased their middle class only by 4.4 percentage points. Between 2004 and 2013 the situation changed considerably. SDC worsened their positive impact on the middle class (-3.9 percentage points), while LME (+1.6 percentage points) and MC (+3 percentage points) significantly increased their influence. As a consequence, a different picture emerges for 2013. Now the LME perform best (+12.9 percentage points), while the poorest performance is observed in the BC (+6.4 percentage points). Finally, we observe a convergence in terms of the middle class and a reduction of redistribution towards the middle class across Europe.

— Figure A.2 about here —

4.3.2   The income share of the middle class

Focusing only on the share of households belonging to the middle class, leaves out the important aspect of how large the share of total income going to the middle class effectively is. It may well be the case that the size of the middle class remains constant, while the income share of the middle strata falls. Figure A.3(a) shows the development of the income share (disposable income) of the middle class per country group from 2004 to 2013.[16] The country group patterns for the income share of the middle class are similar to the size of the middle class shown in Figure A.2. In SDC the middle class obtains the largest share of total income with 36.7% in 2013. Conversely, the middle class in the BC only receives 23% of total income. The development between 2004 and 2013 shows that the income share of the middle class declined most in the SDC (4 percentage points), whereas LME show the largest rise of their income share (3.4 percentage points). Looking at the share of total factor income, as shown in Figure A.3(b), a similar impression emerges. SDC still obtain the largest income

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[16]For calculating the income share of the middle class we leave out negative incomes.

share of their middle class (26.8%) and BC the smallest (16.8%). However, the development between 2004 and 2013 shows an interesting result. The income share of the MC middle class lost 3.8 percentage points, whereas it increased strongest by 1.2 percentage points in the LME. In general we see a highly significant correlation between the size of the middle class and its total income share.[17] Figure A.3(c) displays how much governmental influence changed the income share of the middle class per country group between 2004 and 2013. This is measured by the difference between the income share of the middle class based on disposable income (Figure A.3(a)) and the income share of the middle class based on factor income (Figure A.3(b)).[18] Thus, we are able to indicate the difference which results due to government transfers and taxes on the income share of the middle class. In 2004, the impact of redistributive policy was highest in SDC (13.6 percentage points) and lowest in the MC (3.6 percentage points). The impact of governmental influence on the income share of the middle class increased considerably in the MC (4.3 percentage points), while it declined significantly in SDC (3.6 percentage points). Hence, in 2013 the highest effect due to redistributive policy on the income share of the middle class can be found in LME (11.9 percentage points), while the BC show the poorest performance (6.2 percentage points).

— Figure A.3 about here —

4.3.3 Income polarization across country groups

When grouping the countries into country groups, the evidence points towards a convergence of income polarization. The polarization index is lowest in Social-Democratic countries (SDC) and Continental European economies (CEE) and highest in the Baltic countries (BC). Overall income polarization increased in most country-groups. Polarization only decreased in the liberal market economies (LME) and remained constant in the Mediterranean countries (MC).

— Figure A.4 about here —

Last, we compare polarization with inequality trends across Europe. Alichi et al. (2016) find that for the U.S. the Gini remained relatively constant since 2000, whereas the polarization index has considerably increased since then. According to their findings for the U.S. they reason that the decline of the middle class in recent years is more worrisome than overall inequality. In order to examine the evolution of the two measures, we take the Gini and polarization index of the 26 countries and compute the weighted average, based on the population size of the respective countries. For Europe, we find that between 2004 and 2005 the Gini index declined whereas the polarization index slightly increased. Since 2005 the Gini

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[17]For 2013: Correlation value = 0.99, p-value = 0.0001741

[18]It is worth noting that we do not calculate how much the middle class, defined as disposable income gains through governmental redistribution, but how much the income share varies depending on whether the middle class definition is based on disposable or factor income.

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and the polarization index follow a similar pattern: up to the crisis before 2007 both indices increased, followed by a decline thereafter until 2011. After the recovery from the crisis both indices started to rise again. These trends are illustrated in Figure A.5(a). In Figure A.5(b) the starting point 2004 is taken as the base year (Index = 100). Again, we note that the two indices follow largely the same trend, except for the first year. However, we observe that the polarization index increased by 2,7% between 2004 and 2013, whereas the Gini index in 2013 is close to the base year.[19] We conduct the same analysis on a country group level. The results are illustrated in Figure A.6. We find that again the patterns are relatively similar at a country group level, as depicted in Figure A.6(a). By closely examining Figure A.6(b), we note that both Gini and polarization increased notably in SDC and CEE. In contrast, in BC and Eastern European countries (EEC) the Gini decreased while polarization increased. LME differ from the other country groups, due to the fact that a decline in both indices can be noted. In MC both indices declined until 2007 and rose afterwards. By 2013 the Gini and polarization index in MC reached the level of 2004 again.[20]

— Figure A.5 about here —

— Figure A.6 about here —

To summarise, income polarization increased in those countries, where we find a declining middle class (with the exception of Greece). Across all 26 European countries, we observe that on average, the polarization index increased slightly more than the Gini coefficient. This holds also true for all country groups, except for the MC, where income inequality increased more than income polarization. Thus, our results suggest that, the increase in polarization may be more worrisome than inequality.

5   Conclusions

In this paper we use EU-SILC cross-sectional data to analyse how the middle class evolved in 26 European countries between 2004 and 2013. We follow the literature by defining the middle class as any household with 75% to 125% of national equivalised disposable median household income.

We found that middle class has decreased in 16 out of 26 countries and identified no unambiguous trend regarding upward or downward mobility. Ireland experienced the most substantial increase, with 6.7 percentage points, while the largest decline occurred in Germany, with 8.6 percentage points.

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[19]As a sensitivity analysis, we take 2005 as base year, as opposed to 2004. We see that overall the patterns of the two indices are very similar. The Gini coefficient increased by 1.1%, whilst the rise of the polarization index amounts to 2.4%.

[20]Again, we conduct the same analysis by taking 2005 as base year. The results only differ for MC and BC. In MC both indices are slightly higher in 2013 than in 2005. Polarization in BC reached the same level in 2013 as 2005, whereas a decline of the Gini can be noted. In the remaining country groups, the general observations are similar when taking 2004 or 2005 as base year.

Analysing potential drivers of a declining middle class we have found no significant results for structural changes of the household composition and the impact of a rising unemployment rate. Our results identify redistributive policy as the most important factor for the size of the middle class. Moreover, we see that for non-elderly households the effect of governmental redistribution is significantly weaker. Therefore, we find that a significant part of governmental redistribution is due to social security and retirement programs for the elderly. However, the impact of redistributive policy on the middle class varies significantly between countries. Due to government transfers and taxes, the middle class increased 17 percentage points in Iceland, while it only rose by 5.3 percentage points in Estonia. Exploring potential explanations for this gap, we define country groups with similar socio-economic policies and institutions. We see that Social-Democratic countries and Central European economies have the biggest, while Baltic and Mediterranean countries have the smallest middle class. Therefore, we conclude that institutional characteristics of Social-Democratic countries such as universal benefits, the aim of achieving full-employment, progressive pecuniary benefits (except for family allowance) tend to be beneficial for the size of the middle class. Moreover, the Central European economies, which are characterized by the importance of social insurance and monetary benefits, support the climate for a prosperous middle class.[21] However, on a country-group basis between 2004 and 2013 a clear convergence in the size of the middle class can be observed and the range between biggest and smallest middle class was reduced from 13.2 to 10.9 percentage points.

Analysing the impact of redistributive policy on the middle class, by comparing its size regarding disposable and factor income, we found interesting results. Social-Democratic countries and Central European economies increased their middle class due to governmental measures by around 10.5 percentage points, while Baltic and Mediterranean countries show the poorest performance. Considering the size of the middle class, these results reflect an expected outcome. The performance of liberal market economies, which did most for their middle class and increased its size due to governmental measures by 12.9 percentage points is worth underlining. This unexpected outcome is striking, because according to Korpi and Palme (1998), liberal market economies are characterised by a high dependency on private welfare organization and mean-tested benefits and are therefore assumed to produce larger inequalities.

Last, our evidence points towards a rising income polarization across Europe, which is accompanied by a downsizing of the middle class. In 15 out 26 countries income polarization increased, most notably in Germany with 5.1 percentage points. On the country-group level, income polarization appears to be converging across Europe. Polarization only decreased in liberal market economies, remained constant in Mediterranean countries, whereas it rose in all other country groups. Comparing the trends of the polarization index and the Gini coefficient, we find that income polarization increased slightly more than income inequality. This finding suggests that is worthwhile to further study income polarization in-depth, owing to

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[21]For more information about institutional characteristics of Social-Democratic and Central European economies see Esping-Andersen and Myles (2011)

the fact that it has substantial implications for the middle class and its well-being.

A Tables and Figures

TABLE A.1 — Country groups

Country Groups	Abbr[a]	Countries
Liberal market economies	LME	Iceland, Ireland, United Kingdom
Continental European economies	CEE	Austria, Belgium, France, Germany, Norway, The Netherlands, Luxembourg
Social-Democratic countries	SDC	Denmark, Finland, Sweden
Mediterranean countries	MC	Cyprus, Spain, Greece, Italy, Portugal
Eastern European countries	EEC	The Czech Republic, Hungary, Poland, Slovakia, Slovenia
Baltic countries	BC	Estonia, Lithuania, Latvia

Notes: [a]Abbreviations

TABLE A.2 — Middle class households as percentage of all households

Country	2004	2013	Δ %[a]
AT	43.2	41.9	-1.3
BE	40.9	38.7	-2.2
CY	34.6	33.3	-1.3
CZ	46.9	49.4	2.5
DE	44.6	36.0	-8.6
DK	45.5	43.5	-2.0
EE	32.1	26.7	-5.4
EL	35.1	34.6	-0.5
ES	32.4	31.1	-1.3
FI	42.3	40.1	-2.2
FR	40.8	43.3	2.5
HU	45.8	43.3	-2.5
IE	29.6	36.3	6.7
IS	47.1	50.2	3.1
IT	35.5	35.8	0.3
LT	32.4	32.3	-0.1
LU	43.6	39.1	-4.5
LV	31.4	29.3	-2.1
NL	45.4	45.2	-0.2
NO	46.0	46.9	0.9
PL	35.4	37.9	2.5
PT	32.8	34.2	1.4
SE	46.8	40.1	-6.7
SI	44.7	42.5	-2.2
SK	47.9	48.8	0.9
UK	33.2	35.7	2.5
Average[b]	39.9	39.1	-0.8
Average[c]	38.8	37.9	-0.9

Notes: [a] percentage points, [b] unweighted, [c] weighted

TABLE A.3 — Mobility share

Country	Δ% upper class[a]	Δ% lower class[a]	mobility ratio
AT	0.04	1.18	0.03
BE	1.66	0.55	3.02
CY	1.45	-0.16	9.06
CZ	-2.16	-0.40	5.40
DE	5.06	3.54	1.43
DK	1.96	0.05	39.20
EE	2.72	2.67	1.02
EL	-2.24	2.74	0.82
ES	0.44	0.87	0.51
FI	1.00	1.22	0.82
FR	-1.28	-1.23	1.04
HU	1.76	0.73	2.41
IE	-1.22	-5.52	0.22
IS	0.11	-3.19	0.03
IT	-0.41	0.18	2.28
LT	0.85	-0.72	1.18
LU	1.70	2.78	0.61
LV	-0.48	2.63	0.18
NL	0.54	-0.39	1.38
NO	-0.19	-0.77	0.25
PL	-0.60	-1.91	0.31
PT	-0.76	-0.65	1.17
SE	1.70	4.97	0.34
SI	1.16	1.10	1.05
SK	0.28	-1.17	0.24
UK	-1.28	-1.23	1.04

Notes: [a] in percentage points

TABLE A.4 — Upward and downward mobility

Group	Middle Class	Mobility	Countries
1	Decline	Upward	Belgium, Cyprus, Germany, Denmark, Estonia, Hungary, Lithuania, the Netherlands, Slovenia
2	Decline	Downward	Austria, Greece, Spain, Finland, Luxembourg, Latvia, Sweden
3	Increase	Upward	Ireland, Iceland, Norway, Poland, Slovakia
4	Increase	Downward	Czech Republic, France, Italy, Portugal, The United Kingdom

TABLE A.5 — Middle class decline and household strings from 2004-2013

Country	change in percentage points[a]	change in percentage points[b]
AT	-1.3	-1.0
BE	-2.2	-2.5
CY	-1.3	-0.4
CZ	2.5	2.4
DE	-8.6	-8.2
DK	-2.0	-2.4
EE	-5.4	-5.0
EL	-0.5	-0.6
ES	-1.3	-1.0
FI	-2.2	-2.5
FR	2.5	2.6
HU	-2.5	-2.5
IE	6.7	7.7
IS	3.1	3.2
IT	0.3	0.1
LT	-0.1	-0.5
LU	-4.5	-3.8
LV	-2.1	-1.5
NL	-0.2	-0.5
NO	0.9	0.1
PL	2.5	1.7
PT	1.4	1.8
SE	-6.7	-7.3
SI	-2.2	-0.9
SK	0.9	0.6
UK	2.5	2.1
Average[c]	-0.8	-0.7
Average[d]	-0.9	-1.0

Notes: [a] original sample, [b] constant household strings, [c] unweighted, [d] weighted

TABLE A.6 — Changes in the middle class and unemployment from 2004 to 2013

Country	change unemployment[a]	change middle class[a]
AT	-0.1	-1.3
BE	0.0	-2.2
CY	11.3	-1.3
CZ	-1.3	2.5
DE	-5.2	-8.6
DK	1.5	-2.0
EE	-1.5	-5.4
EL	16.9	-0.5
ES	15.1	-1.3
FI	-0.6	-2.2
FR	1.4	2.5
HU	4.1	-2.5
IE	8.6	6.7
IS	2.3	3.1
IT	4.1	0.3
LT	0.9	-0.1
LU	0.9	-4.5
LV	0.2	-2.1
NL	1.6	-0.2
NO	-0.8	0.9
PL	-8.8	2.5
PT	8.6	1.4
SE	0.6	-6.7
SI	3.8	-2.2
SK	-4.2	0.9
UK	2.9	2.5
Average[a]	2.4	-0.8
Average[b]	1.0	-0.9

Notes: [a] in percentage points, [b] unweighted, [c] weighted

TABLE A.7 — Middle class households based on factor income as percentage of all households

Country	2004[b]	2013	Δ %[a]
AT	32.4	29.0	-3.4
BE	26.2	26.8	0.6
CY	29.8	25.1	-4.7
CZ	33.2	34.7	1.5
DE	32.3	25.5	-6.8
DK	28.3	28.7	0.4
EE	24.5	21.4	-3.1
EL	24.8	26.2	1.4
ES	28.1	23.2	-5.0
FI	28.7	27.1	-1.7
FR	34.8	35.0	0.2
HU	34.3	33.8	-0.5
IE	19.8	20.4	0.5
IS	32.4	33.2	0.8
IT	28.6	29.3	0.7
LT	26.3	25.5	-0.7
LU	32.4	29.1	-3.3
LV	20.7	22.9	2.2
NL	28.8	29.0	0.2
NO	28.3	32.2	3.9
PL	28.1	31.3	3.2
PT	25.5	25.0	-0.5
SE	33.2	33.2	0.0
SI	29.0	29.2	0.3
SK	33.1	34.2	1.1
UK	21.8	23.0	1.2
Average[c]	28.7	28.2	-0.4
Average[d]	29.2	28.1	-1.1

Notes: [a] in percentage points, [b] 2005: ES; 2006: EL, FR, IT, LV and PT, [c] unweighted, [d] weighted

TABLE A.8 — Non-elderly[d] Middle class households

Country	disposable income			factor income		
	2004	2013	Δ %[a]	2004	2013	Δ %[a]
AT	45.4	42.2	-3.2	34.4	30.8	-3.7
BE	43.4	39.8	-3.6	33.0	31.7	-1.4
CY	41.8	35.1	-6.7	39.8	28.4	-11.4
CZ	44.1	48.3	4.2	37.5	37.5	0.0
DE	43.1	35.0	-8.0	31.0	26.9	-4.0
DK	47.6	41.5	-6.0	36.1	31.2	-4.9
EE	34.7	30.0	-4.7	29.3	26.0	-3.3
EL	34.5	29.7	-4.7	29.3	26.8	-2.5
ES	32.6	28.9	-3.7	34.7	25.2	-9.5
FI	44.8	41.9	-3.0	31.8	30.8	-1.0
FR	42.7	43.6	0.9	37.4	36.8	-0.7
HU	41.1	38.3	-2.7	29.4	30.4	1.0
IE	35.9	36.4	0.5	26.1	20.4	-5.7
IS	49.0	51.0	2.0	35.7	36.0	0.3
IT	35.9	33.7	-2.2	34.1	30.2	-3.9
LT	30.7	30.3	-0.4	25.2	26.0	0.8
LU	40.1	34.8	-5.3	29.6	25.3	-4.3
LV	30.6	31.9	1.3	27.7	27.1	-0.6
NL	44.1	42.5	-1.6	34.5	30.2	-4.3
NO	49.2	46.9	-2.3	31.4	33.6	2.2
PL	30.5	35.4	4.9	24.2	31.5	7.2
PT	34.1	35.1	1.0	29.2	27.7	-1.6
SE	48.9	42.4	-6.4	34.0	33.2	-0.9
SI	48.2	44.7	-3.5	35.4	35.8	0.3
SK	44.7	47.0	2.3	38.2	41.2	3.0
UK	34.3	33.6	-0.7	26.8	24.7	-2.1
Average[b]	40.5	38.5	-2.0	32.1	30.2	-2.0
Average[c]	38.7	36.6	-2.1	31.9	29.6	-2.3

Notes: [a] in percentage points, [b] unweighted, [c] weighted, [d] Non-elderly means that household head is under 60 years old

TABLE A.9 — Polarization index

Country	2004	2013	Δ %[a]
AT	21.5	22.4	0.9
BE	22.6	23.3	0.7
CY	26.8	29.6	2.8
CZ	20.8	19.3	-1.5
DE	20.9	26.0	5.1
DK	20.0	21.9	1.9
EE	31.2	36.4	5.2
EL	28.6	27.2	-1.4
ES	29.1	30.4	1.3
FI	21.7	22.6	0.9
FR	23.1	22.2	-0.9
HU	20.3	22.1	1.8
IE	29.3	27.0	-2.3
IS	19.8	18.8	-1.0
IT	26.6	26.2	-0.4
LT	31.6	31.9	0.3
LU	22.1	23.8	1.7
LV	32.2	33.2	1.0
NL	20.7	21.3	0.6
NO	19.5	19.3	-0.2
PL	28.0	25.7	-2.4
PT	32.5	29.3	-3.2
SE	19.3	22.5	3.2
SI	20.5	22.0	1.5
SK	19.6	19.4	-0.3
UK	29.1	26.8	-2.3
Average[b]	24.5	25.5	1.0
Average[c]	25.9	26.6	0.7

Notes: [a] in percentage points, [b] un-weighted, [c] weighted

FIGURE A.1 — M-curves, First and Second Polarization Curves in Germany
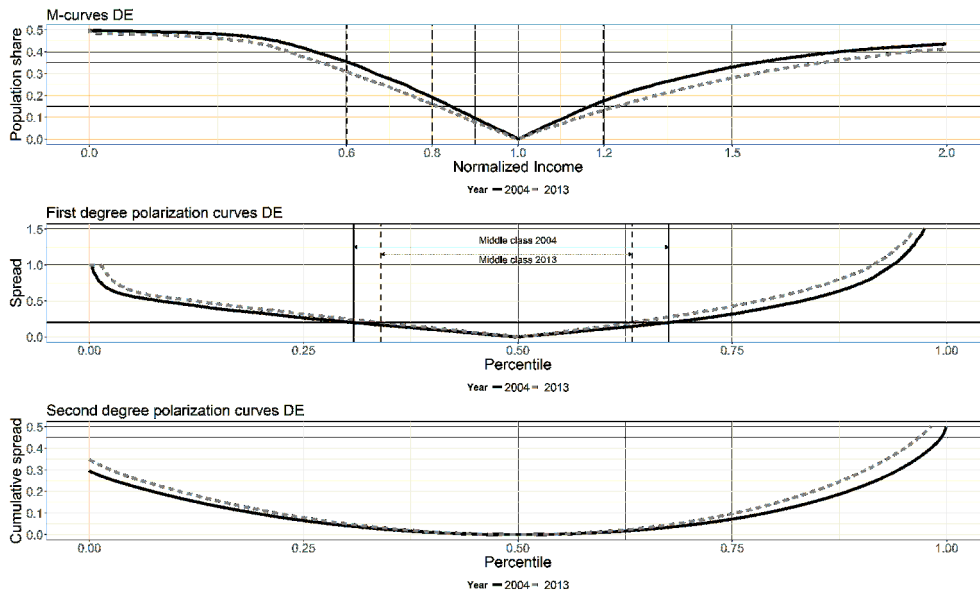
FIGURE A.2 — The evolution of the size of the middle class on country group level
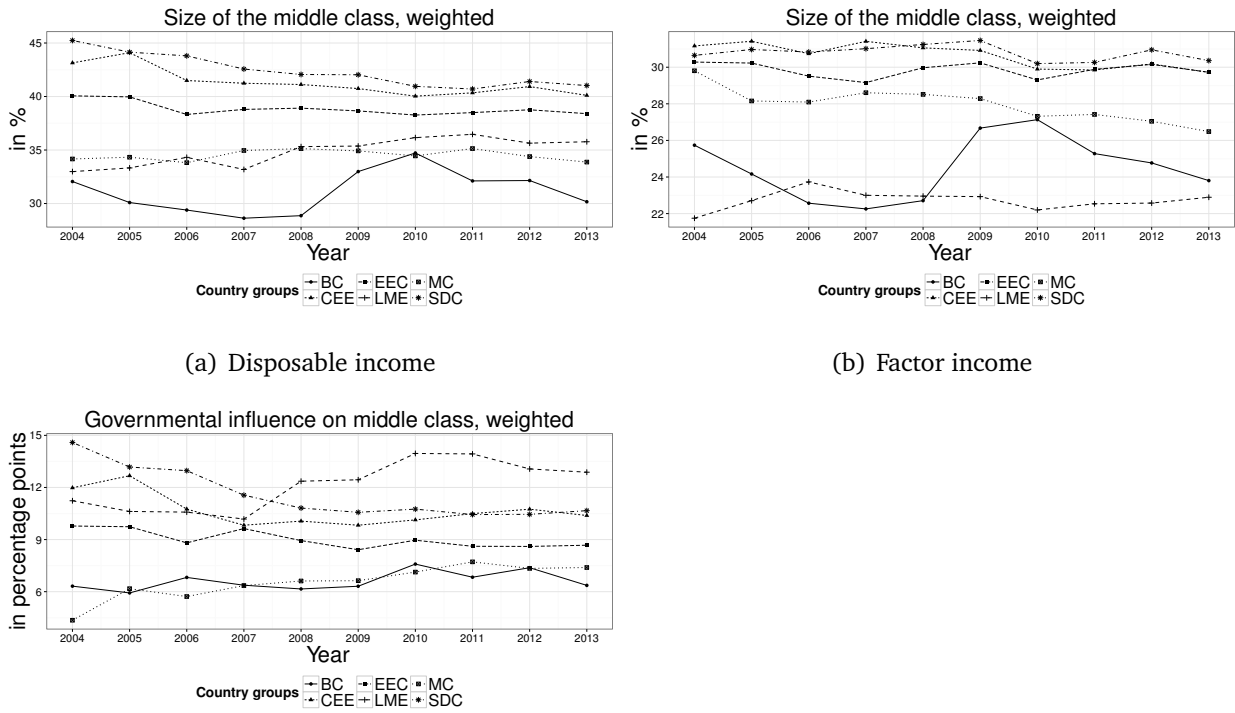
(a) Disposable income

(b) Factor income

(c) Difference of the middle class between disposable and factor income

FIGURE A.3 — The evolution of the income of the middle class on country group level
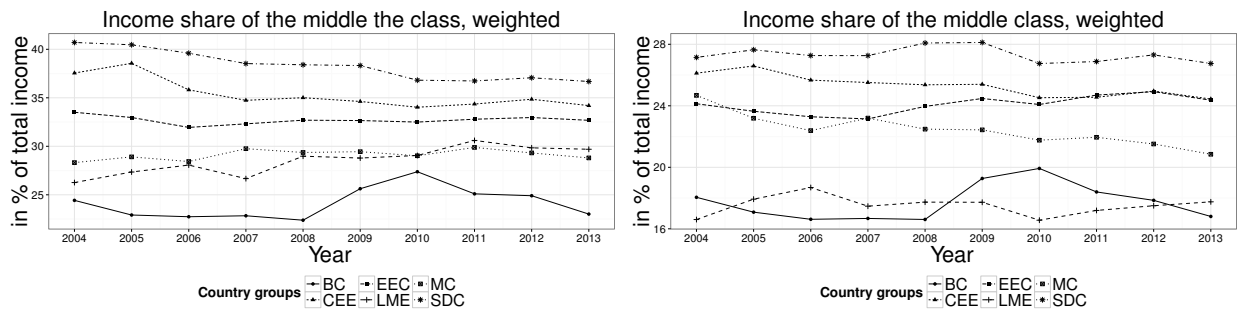
(a) Disposable income
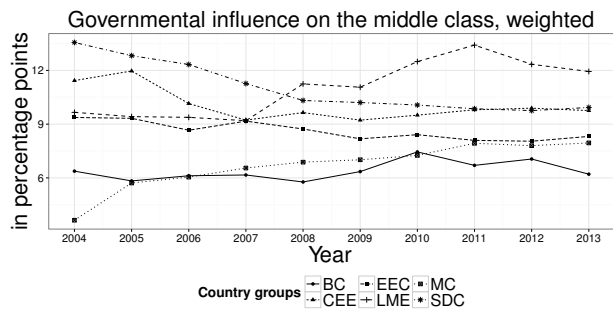
(b) Factor income

(c) Difference of the middle class between disposable
and factor income

FIGURE A.4 — The evolution of the polarization index on country group level
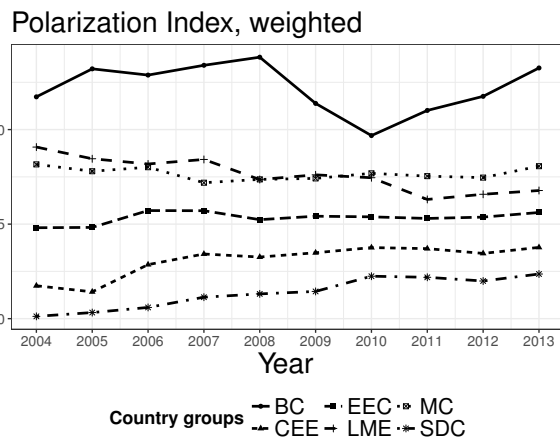
FIGURE A.5 — The evolution of the Gini and polarization index

(a) Index

(b) Index (2004=100)
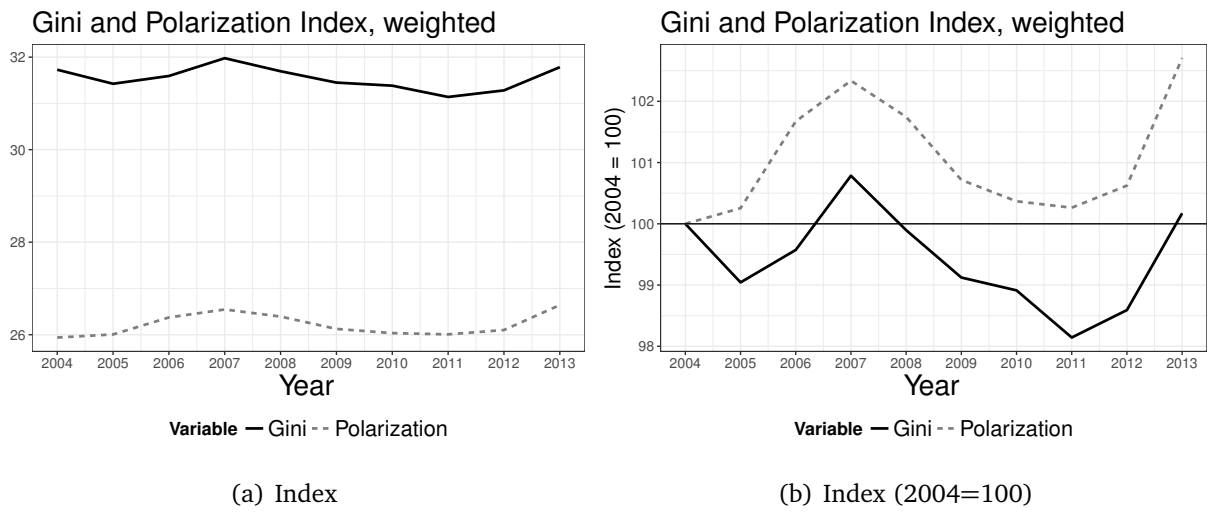
FIGURE A.6 — The evolution of the Gini and polarization index on country group level

(a) Index

(b) Index (2004=100)
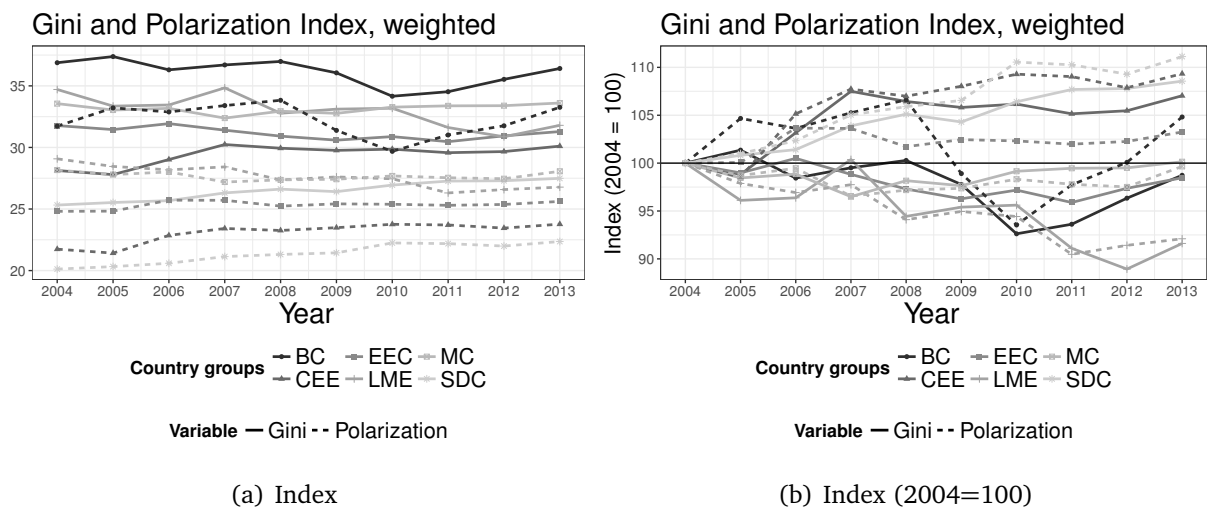
FIGURE A.7 — M-curves, First and Second Polarization Curves

(a) Austria

(b) Belgium

29

M-curves CY

First degree polarization curves CY

Second degree polarization curves CY

(c) Cyprus

M-curves CZ

First degree polarization curves CZ

Second degree polarization curves CZ
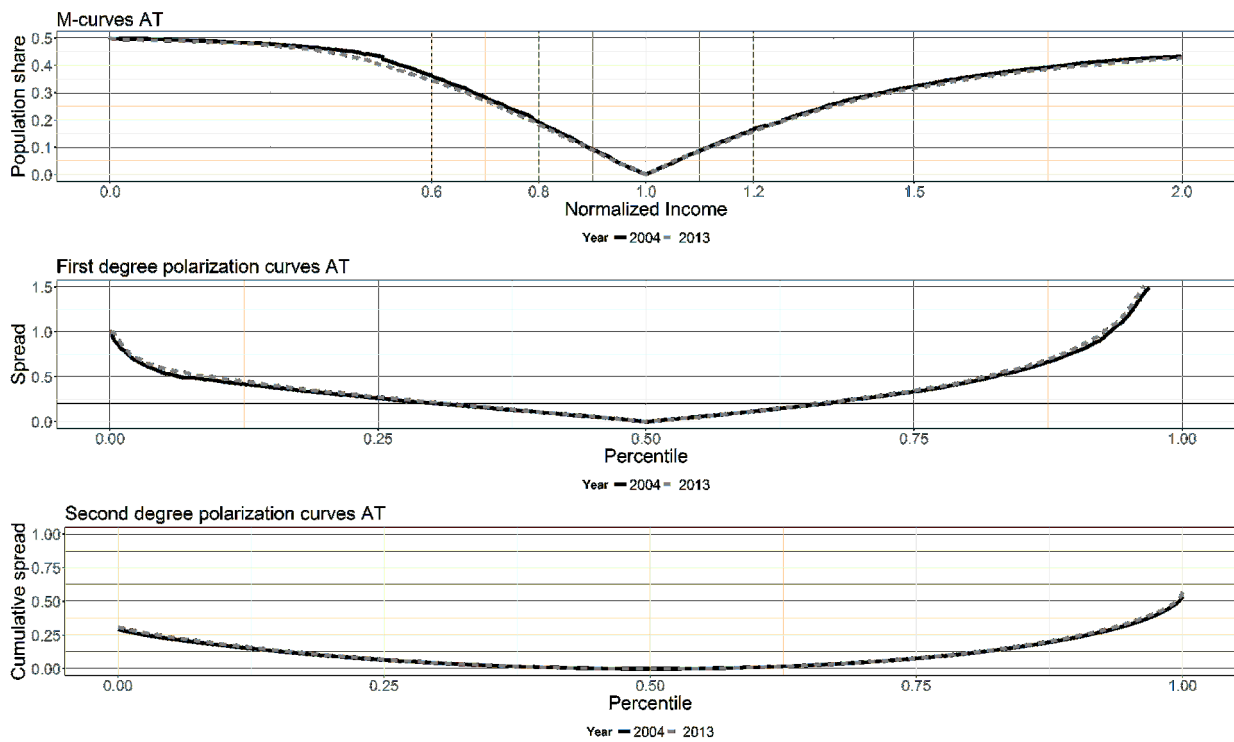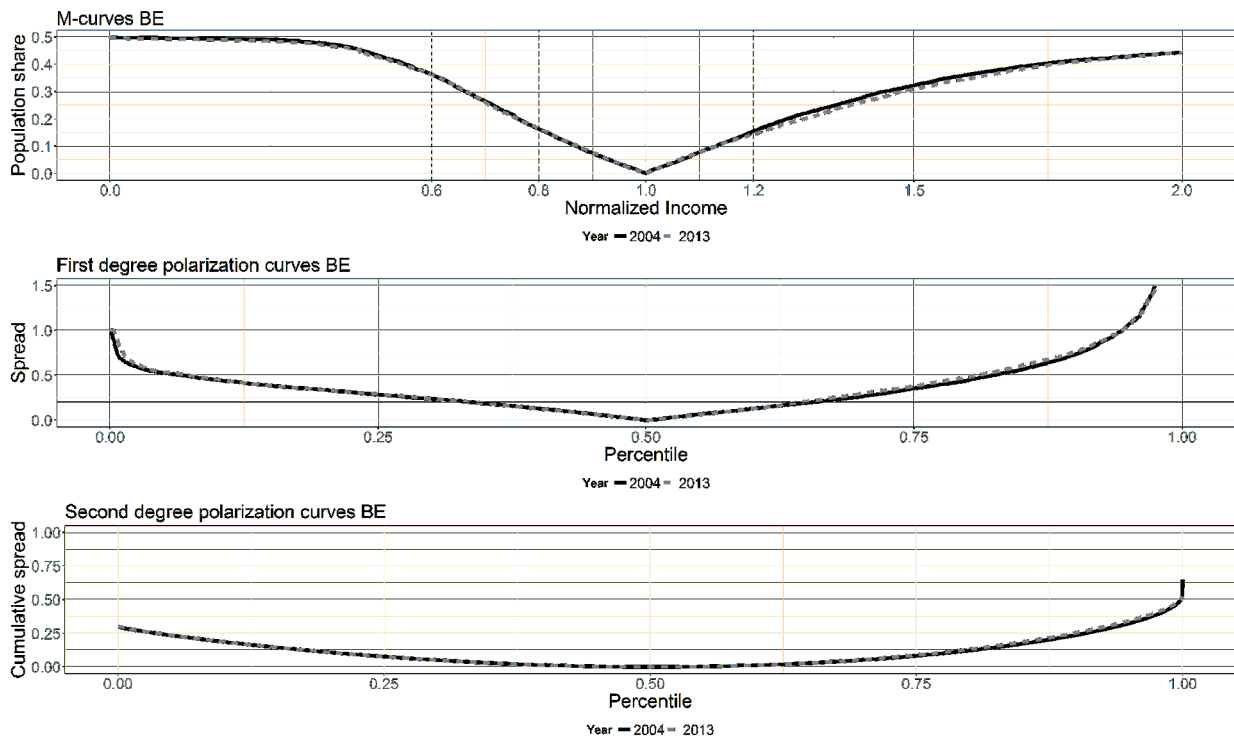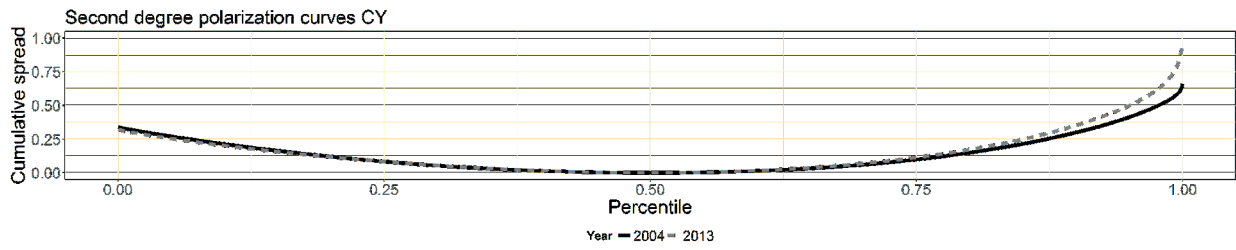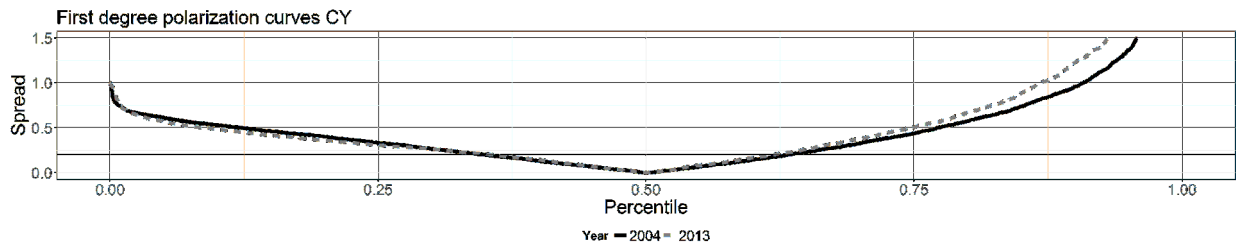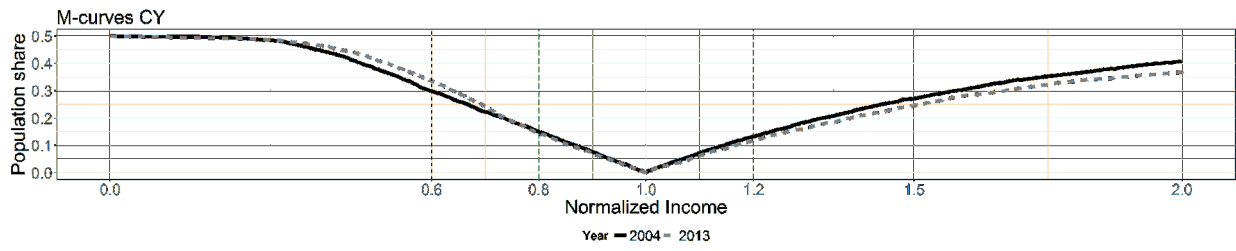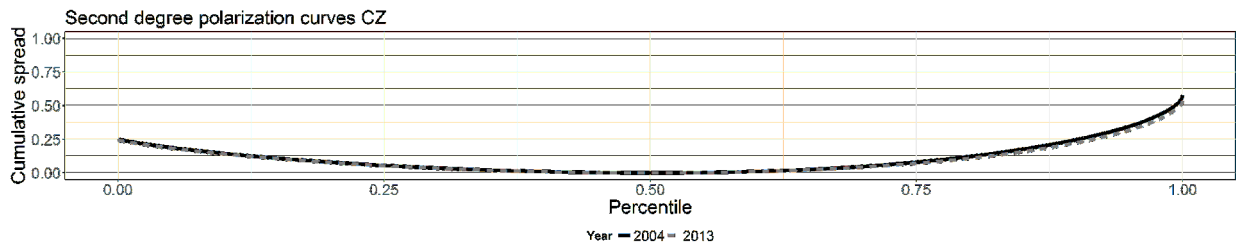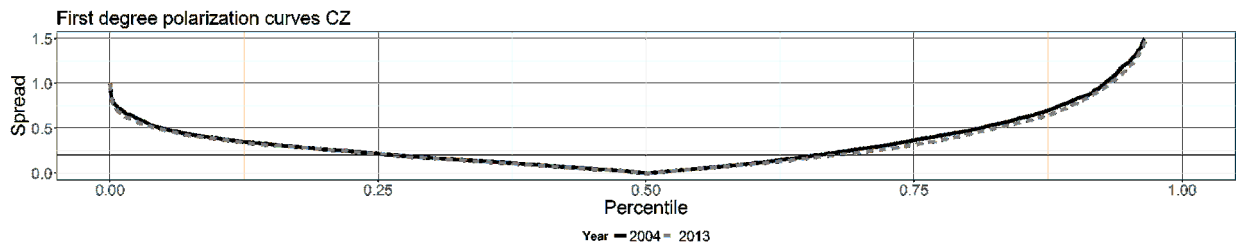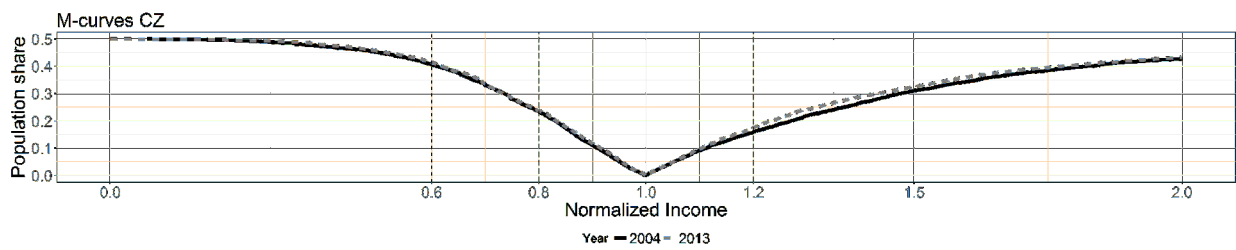
(d) Czech Republic

(e) Denmark

(f) Estonia

M-curves EL

Year — 2004 = 2013

First degree polarization curves EL

Year — 2004 = 2013

Second degree polarization curves EL

Year — 2004 = 2013

(g) Greece

M-curves ES

Year — 2004 = 2013

First degree polarization curves ES

Year — 2004 = 2013

Second degree polarization curves ES

Year — 2004 = 2013
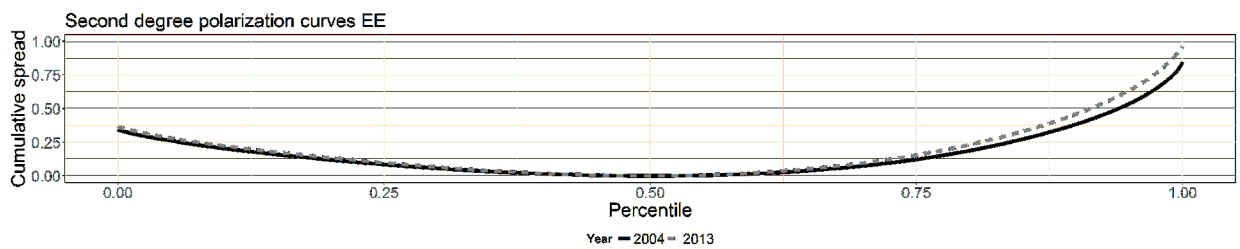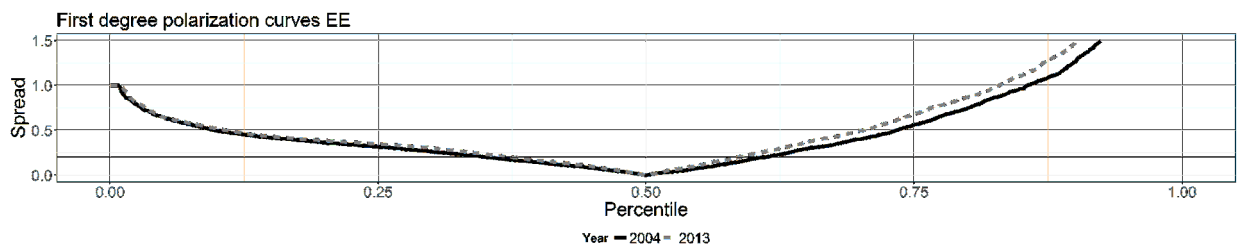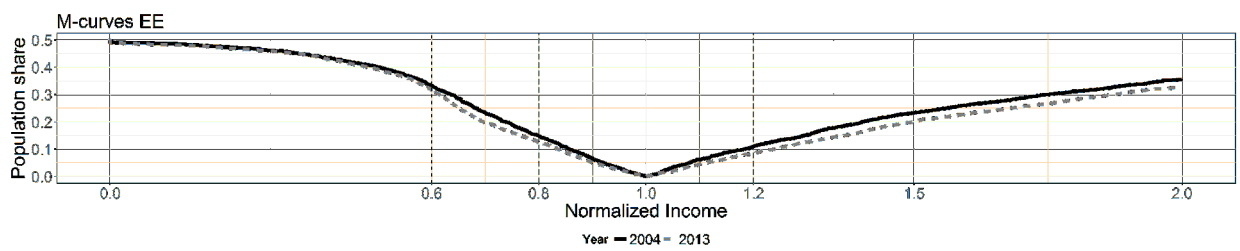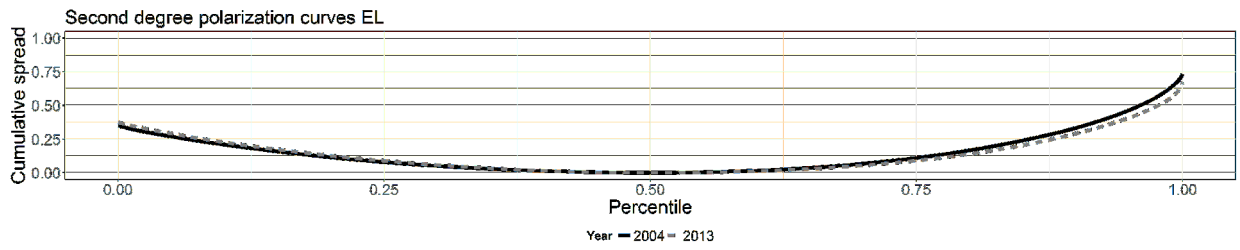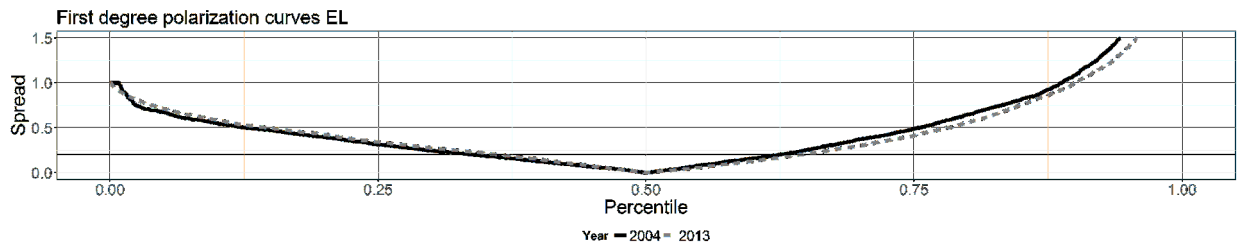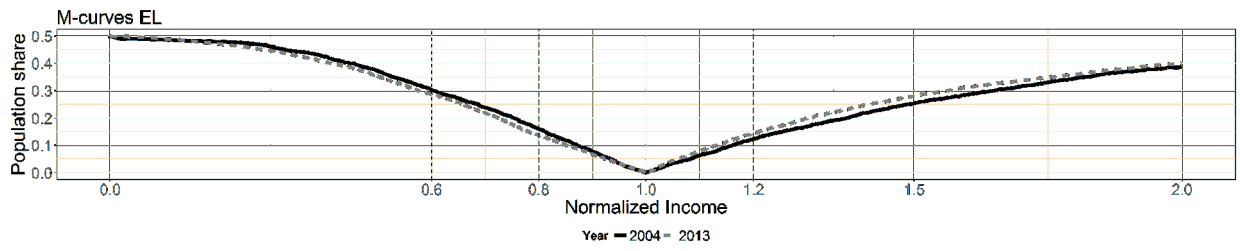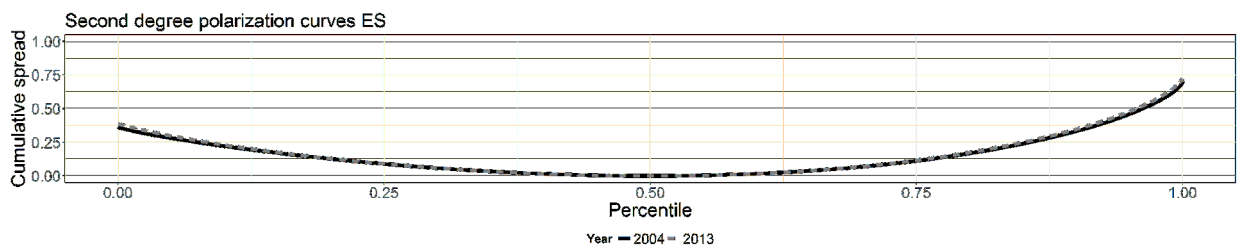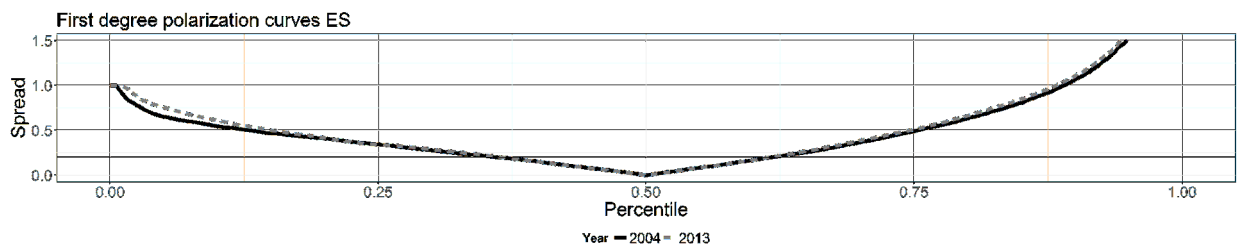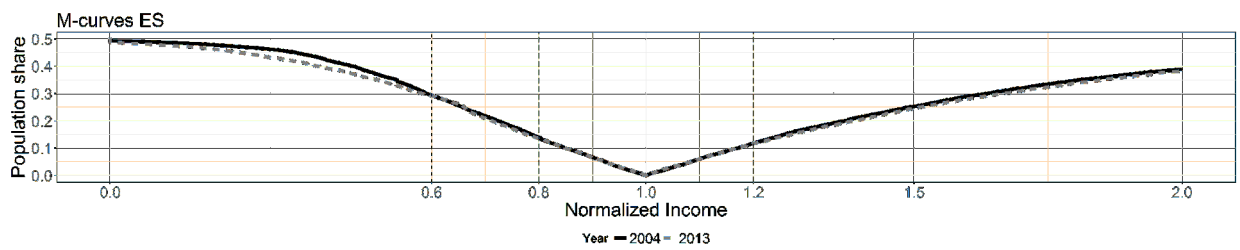
(h) Spain
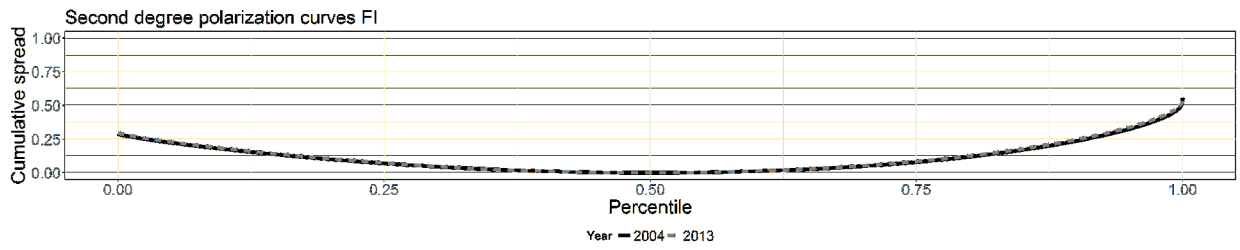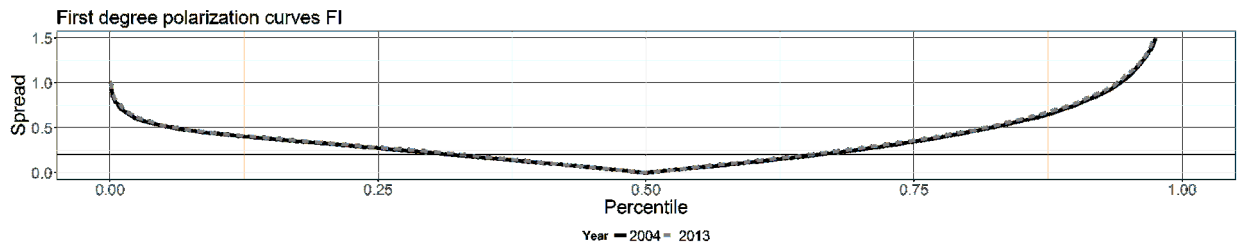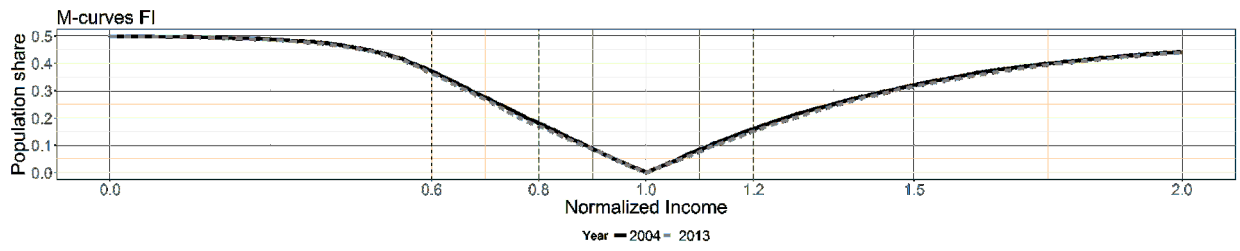
(i) Finland
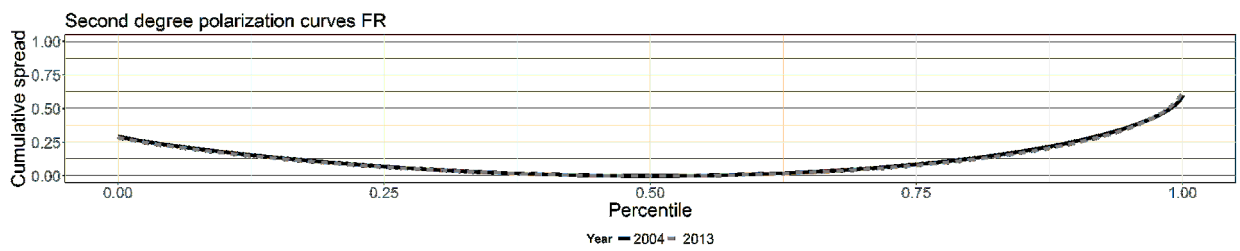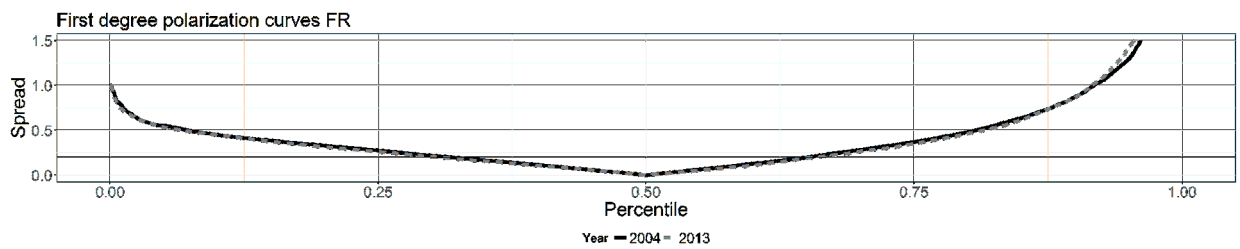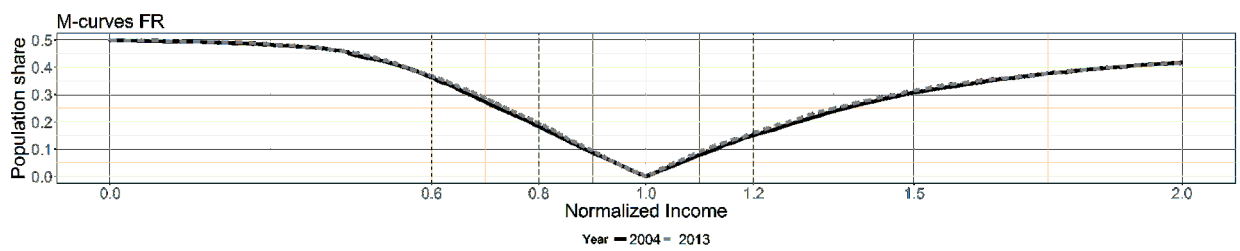
(j) France
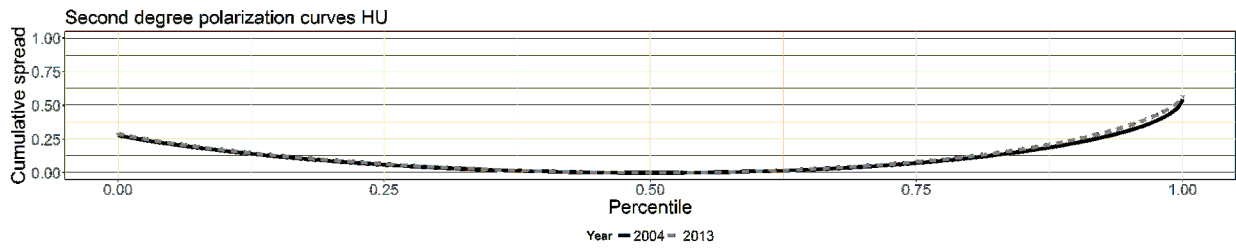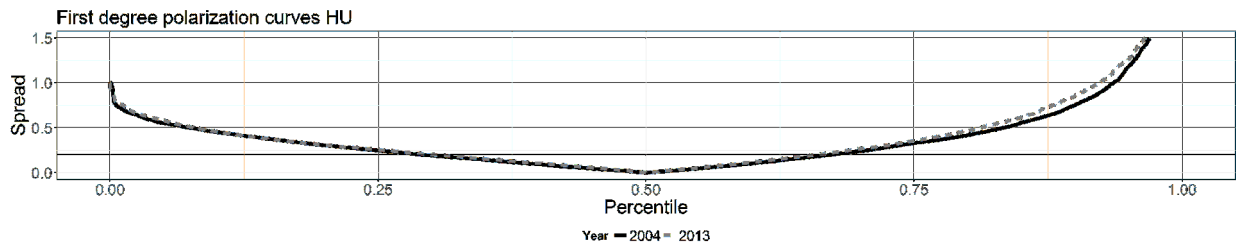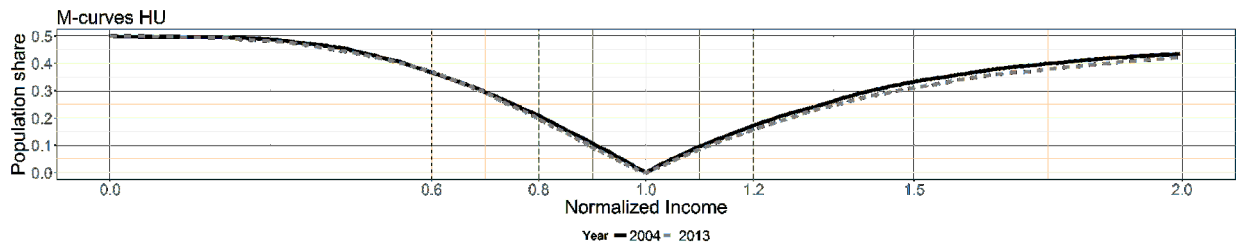
(k) Hungary
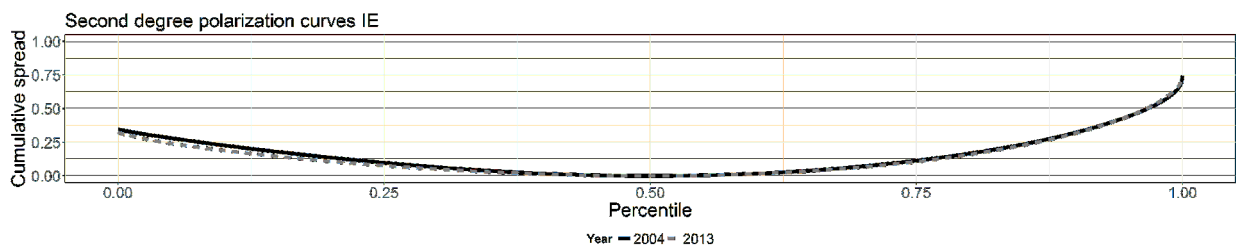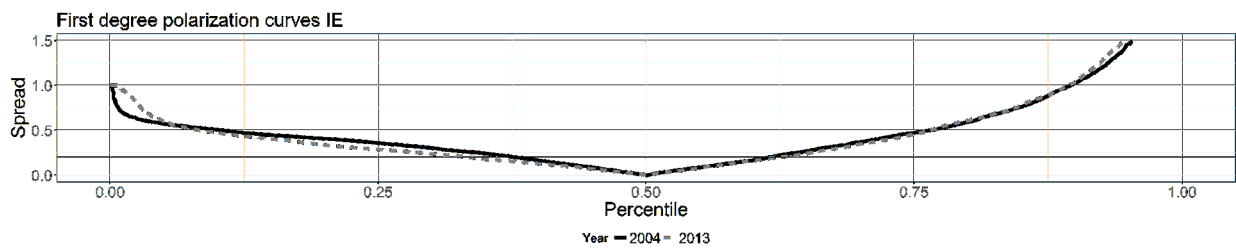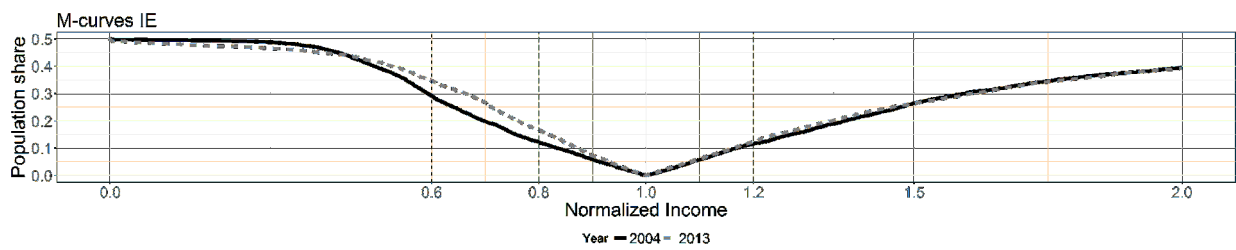
(l) Ireland
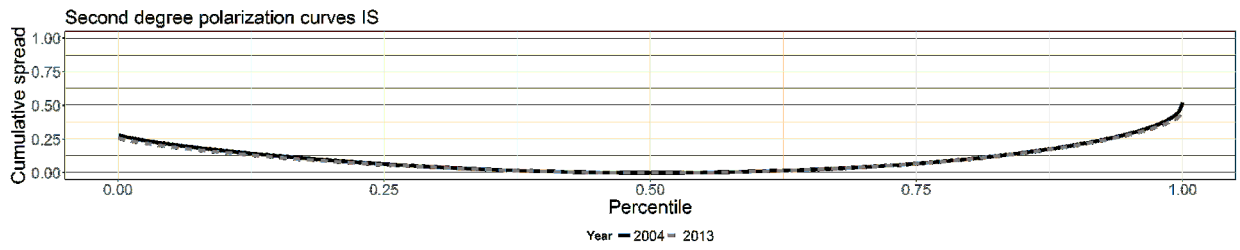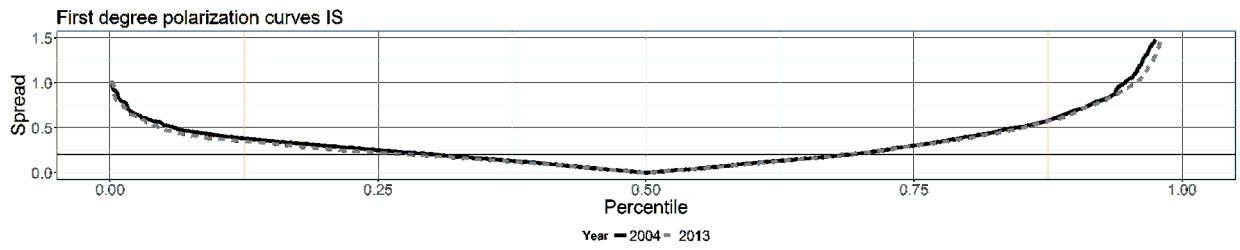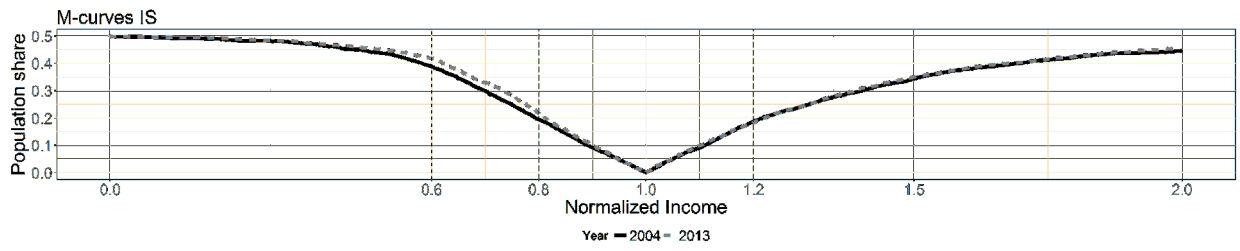
(m) Iceland
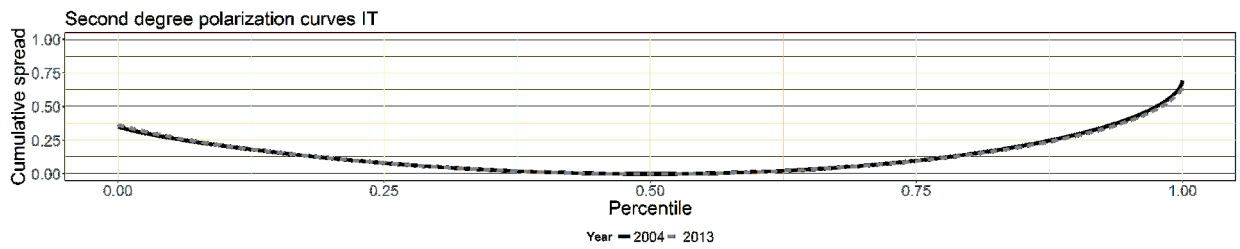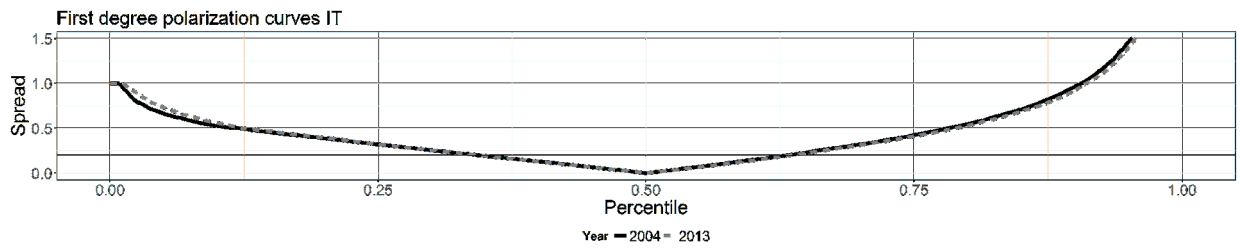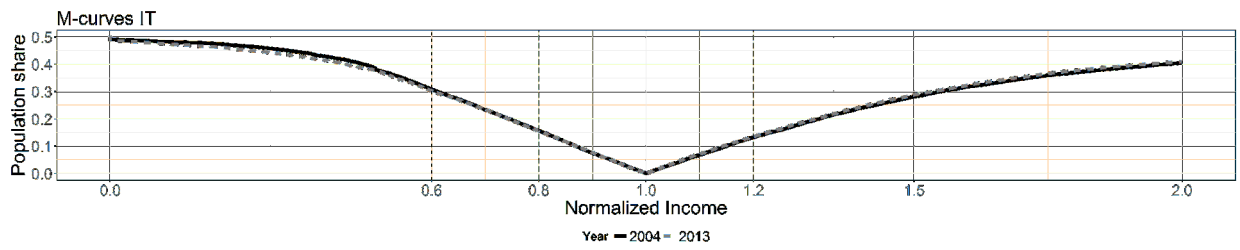
(n) Italy
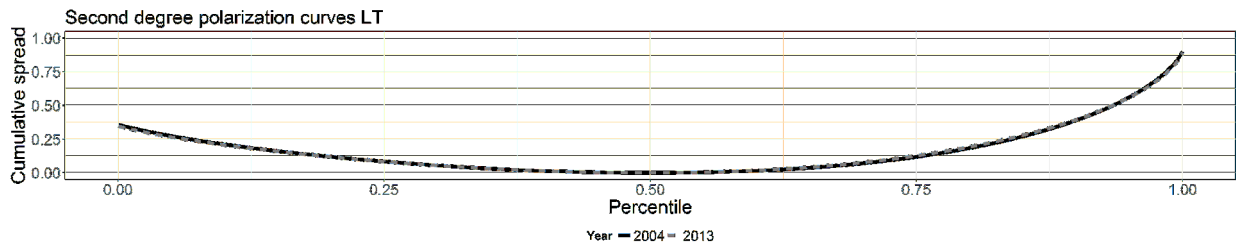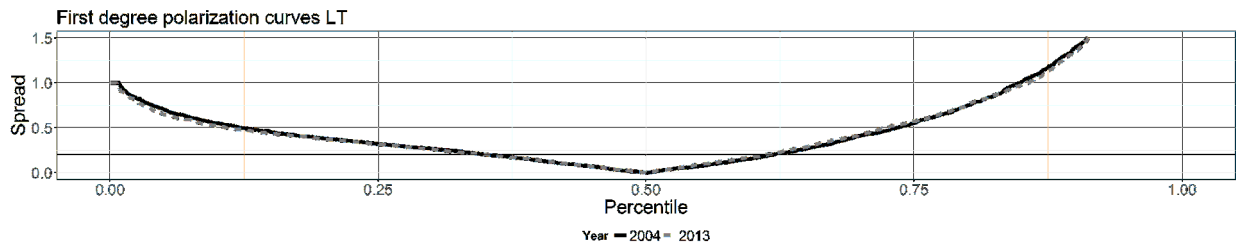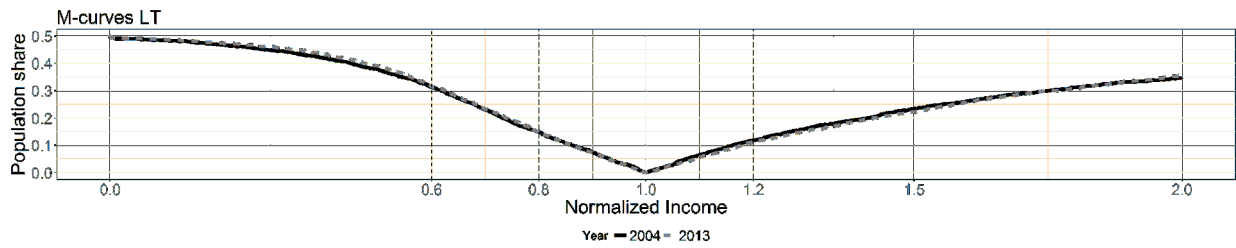
(o) Lithuania
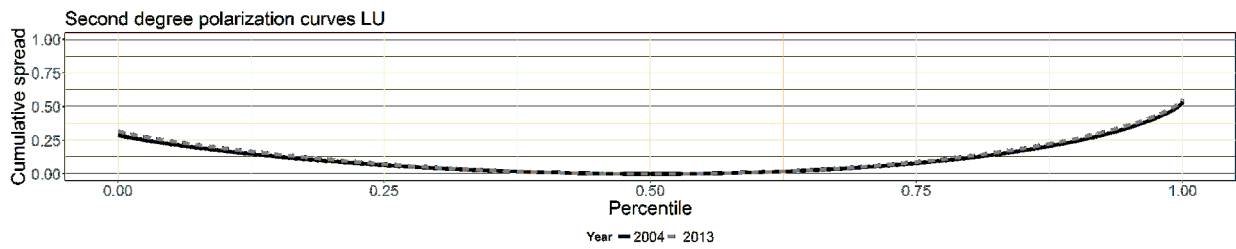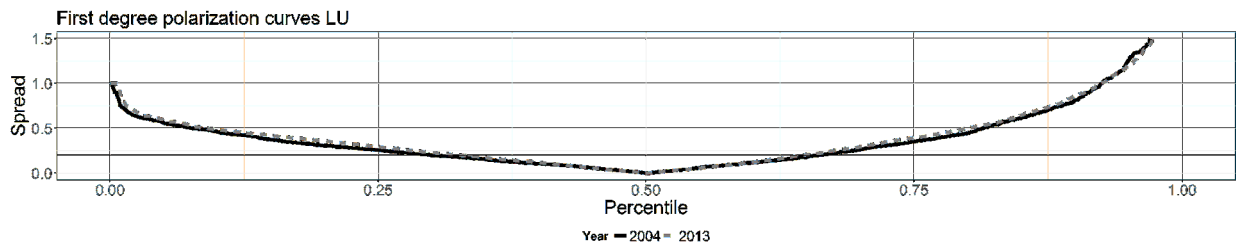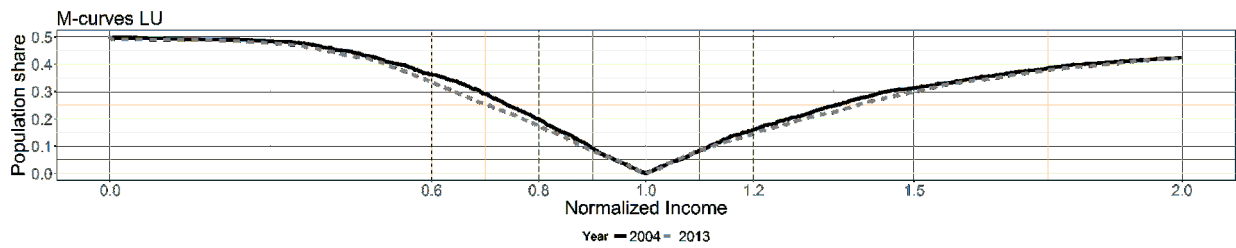
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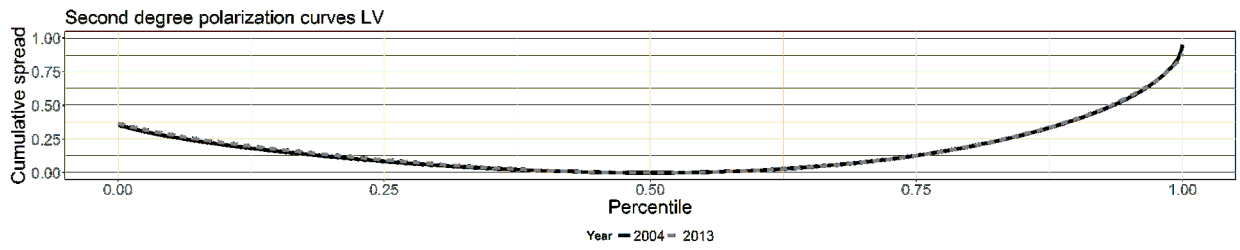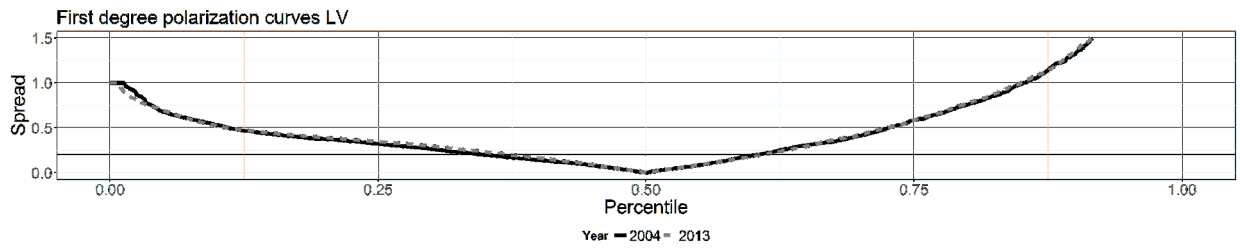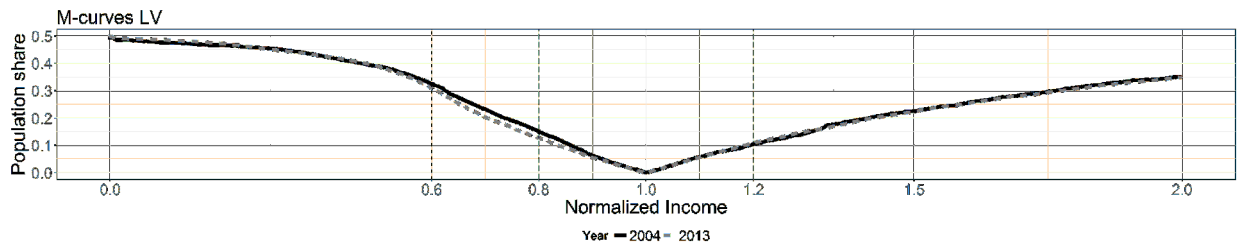
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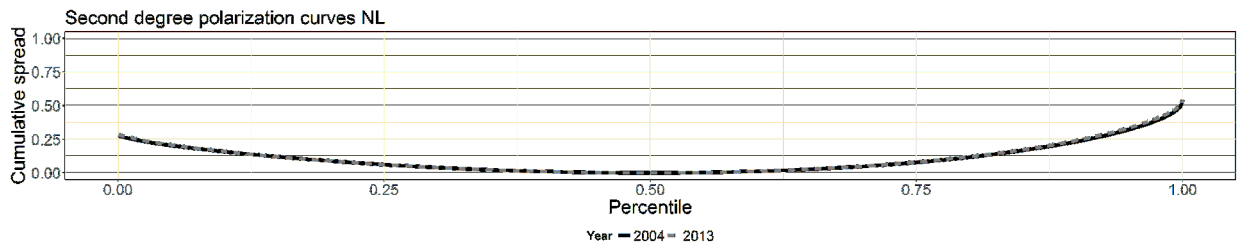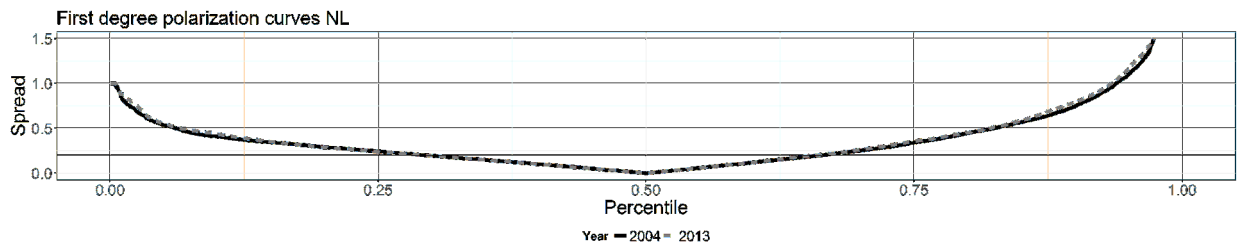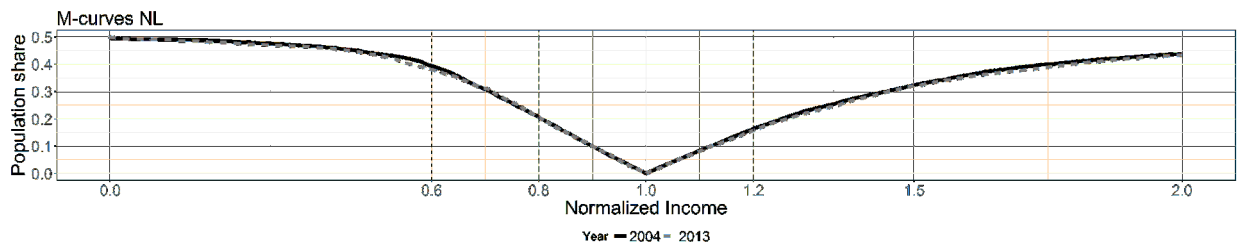
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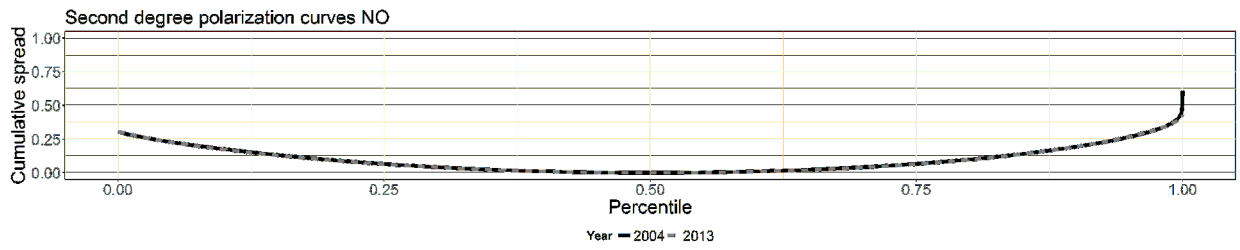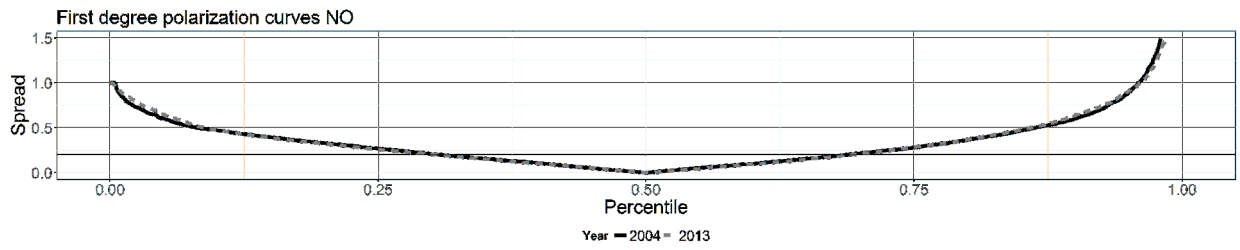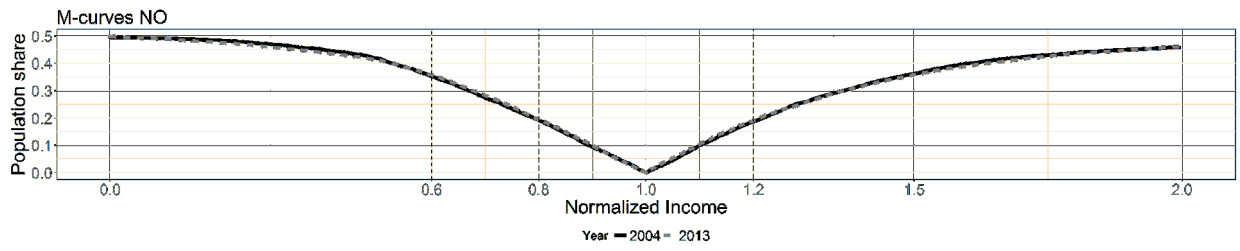
(s) Norway
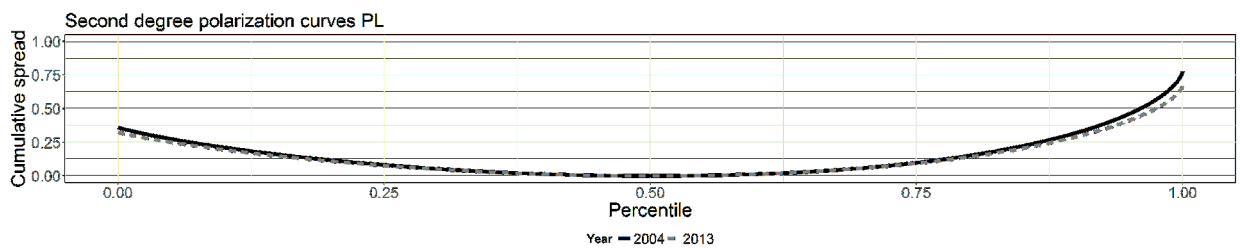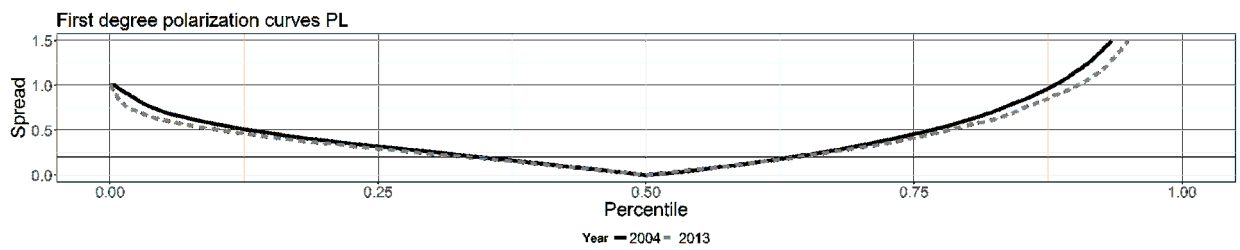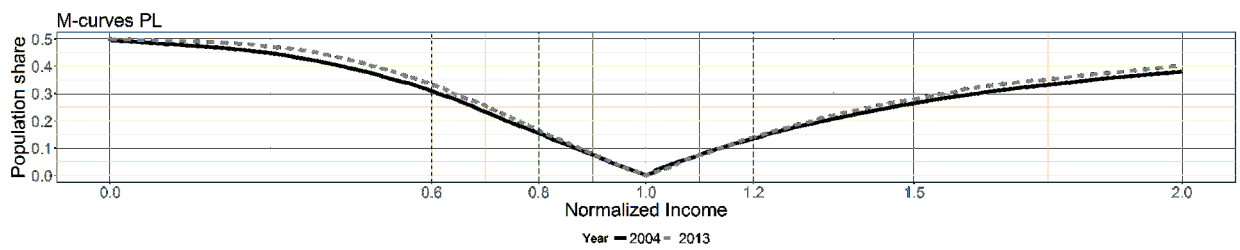
(t) Poland

(u) Portugal

(v) Sweden

M-curves SI

First degree polarization curves SI

Second degree polarization curves SI

(w) Slovenia

M-curves SK

First degree polarization curves SK

Second degree polarization curves SK

(x) Slovakia

40

M-curves UK

First degree polarization curves UK

Second degree polarization curves UK
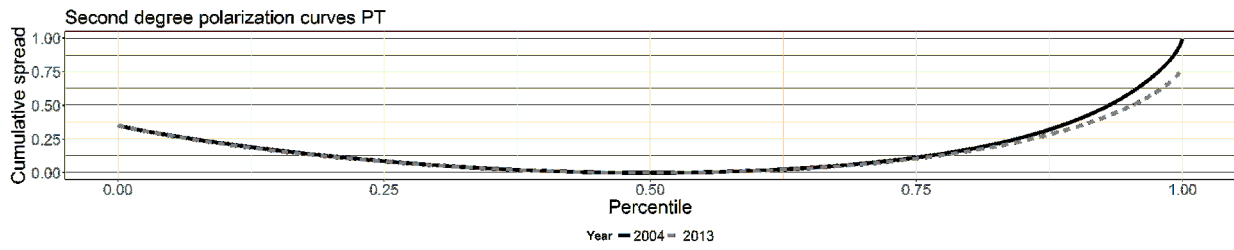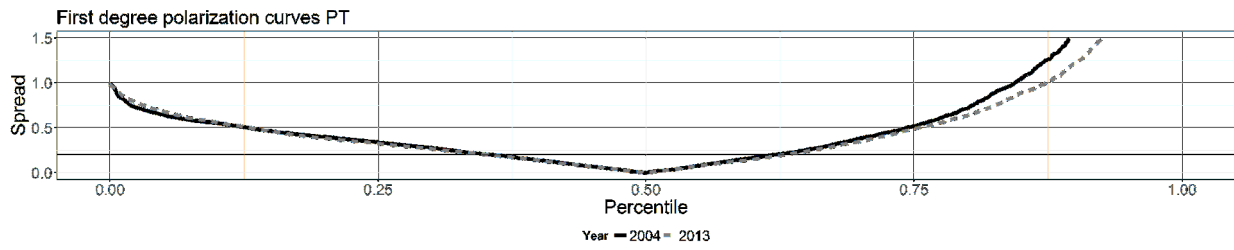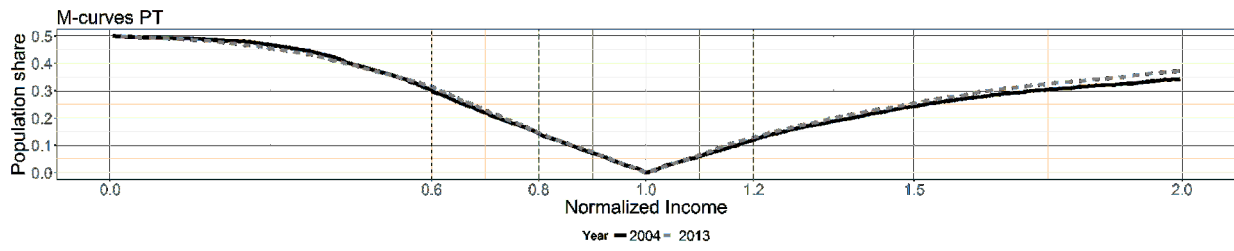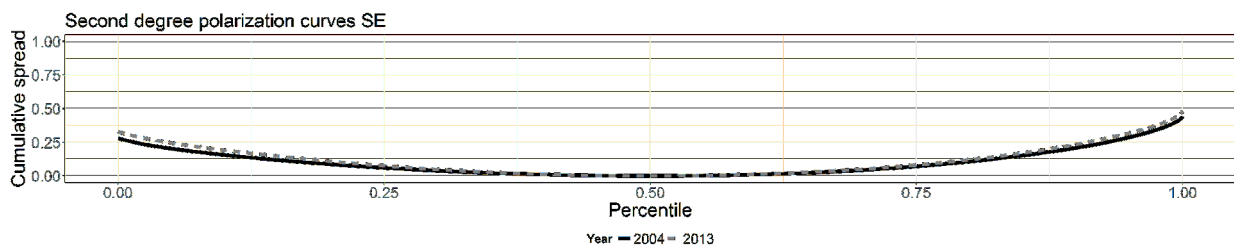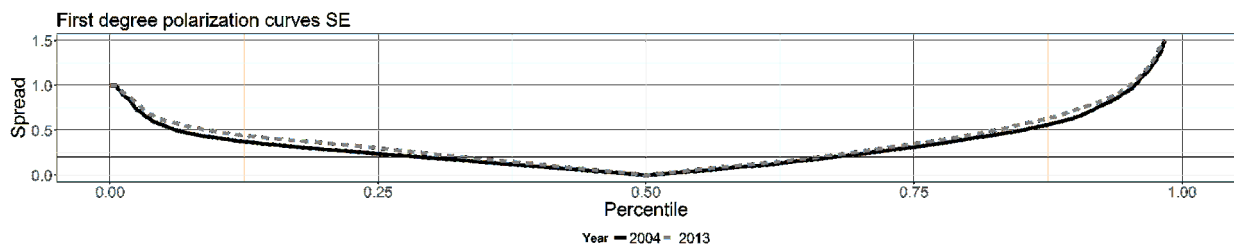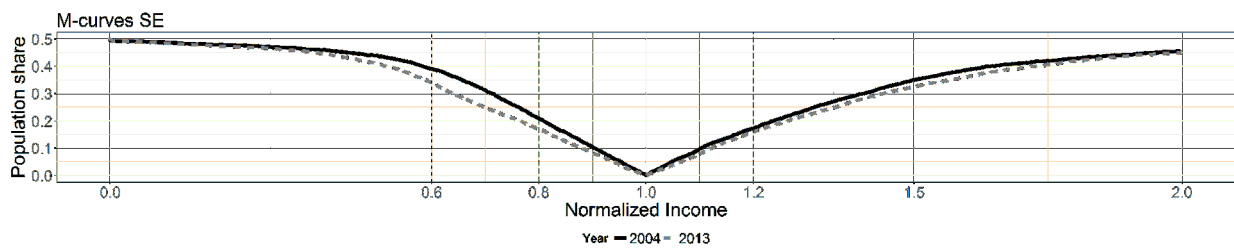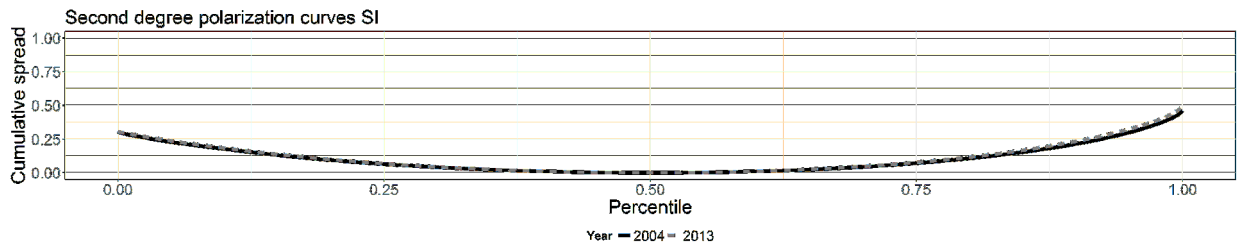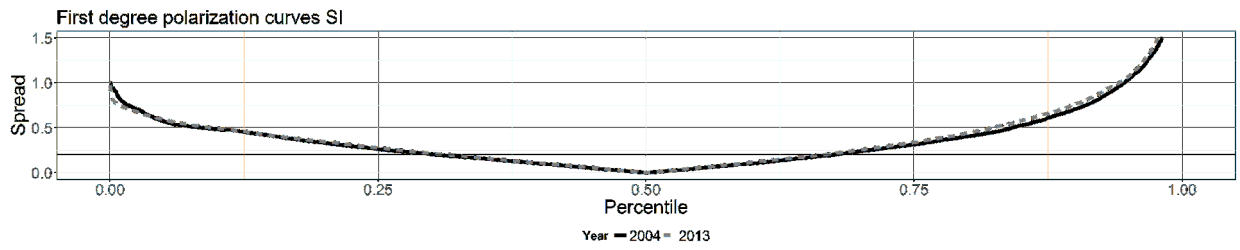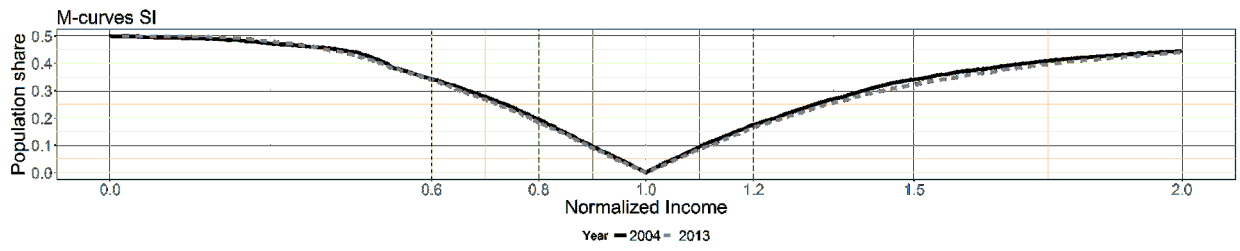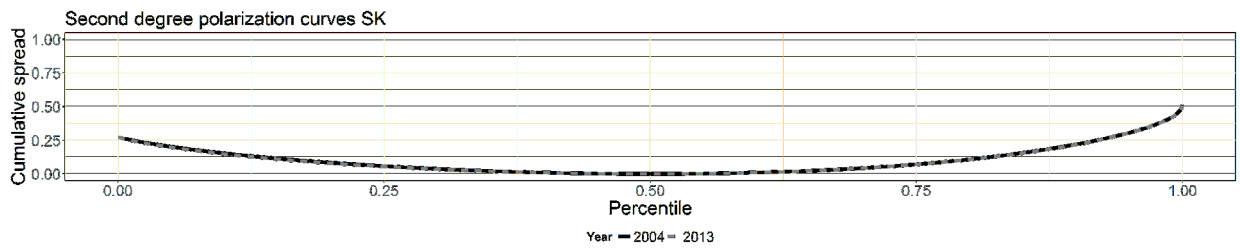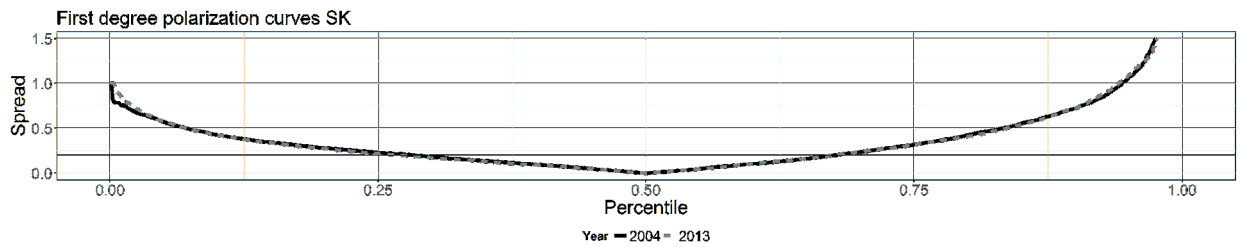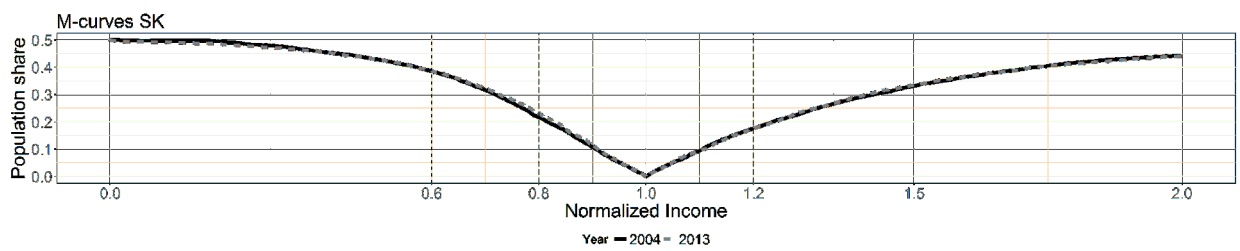
(y) United Kingdom

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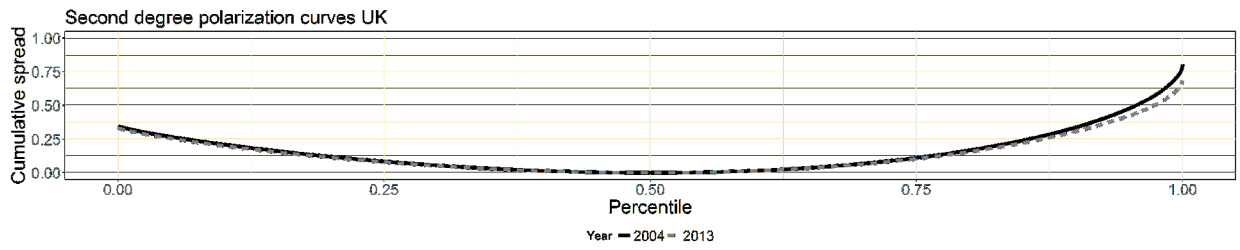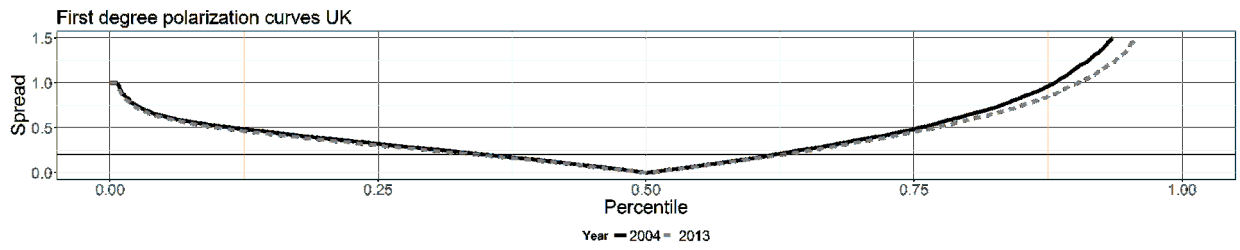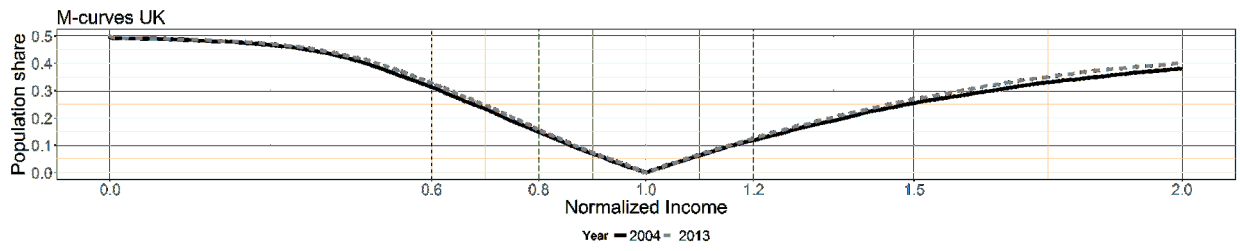**URL:** *https://www.imf.org/external/pubs/ft/wp/2016/wp16121.pdf*

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