The Decline of the Middle Class. New Evidence for Europe*

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Abstract

This paper examines how the middle class has fared in 26 European countries between 2004 and 2014 based on European Survey on Income and Living Conditions (EU-SILC) data. We define individuals living in households with a median equivalised disposable household income between 75% and 125% to be middle class. We find that the middle class has decreased in 18 out of 26 countries, which is accompanied by an increase of income polarization. Redistributive policies are most influential for explaining differences in the size of the middle class across European countries. Exploring potential explanations for this gap, we examine country groups with similar socio-economic policies and institutions.

Keywords: middle class, EU-SILC, institutional settings, income inequality, polarization
JEL Classification: D31, D63, P51

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1 Introduction

Scholars and politicians have long pointed out the importance of a stable and large middle class. Birdsall et al. (2000, p. 1) consider the middle class to be “the backbone of both the market economy and of democracy in most advanced countries”. The reasons for the economic importance of the middle class range from positive effects on aggregate demand and investments in education (Thewissen et al., 2015), entrepreneurship (Acemoglu et al., 1997) to rising income levels due to demand for quality consumer goods of middle-class households (Murphy et al., 1989). Others call attention to detrimental economic effects of a shrinking middle class: Rajan (2011) and Reich (2010) argue that growing income inequality fuels household debt when lower and middle income households try to smooth their consumption in times of income fluctuations, which leads to greater financial instability.¹ This argument is supported by findings of Scott et al. (2011) and Scott et al. (2013) which state that the middle class in the United States is squeezed by income inequality on the one and rising interest payments on past debt on the other hand. 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).² Aristotle 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) also finds that democracy increases with the share of middle-class income.

Hence, the middle class forms a vital pillar for sociol cohesion, economic performance and democracy, but is currently endangered by rising levels of income inequality and income polarization. The aftermath of the financial crisis in 2007 has renewed the interest in income and wealth inequality, as well as the concern about the hollowing out of the middle class. Still, research on distributional issues often focuses on either low-income households or top incomes. Those in the middle of the income distribution have received much less attention by scholars. The renewed interest in the well-being of the middle class translated into a growing

¹“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, p. 25).
²See: Book IV, IX. 6 - 8
body of literature, where numerous studies find a declining middle class.\(^3\) Fukuyama (2012) raises the question, 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.

Based on the outlined considerations concerning the significance of the middle class, it is worthwhile to carefully study the development of the middle class in Europe. In particular we want to find out whether the middle class across Europe has declined between 2004 and 2014, and if so whether the lower, the upper income class or both increased. The most difficult part is to establish how the middle class should be measured. We define the middle class as households living on between 75% and 125% of the national median equivalised disposable household income. First, this is the most established definition in the literature. Second, we believe that households belonging to the middle class should be well above the risk-of-poverty threshold (usually defined as 60% of the median income) and have similar income resources, which translates into an average standard of living in the respective country. Bearing in mind the unavoidable arbitrariness of the thresholds, we verify whether the findings concerning the change of the middle class population share depends on the specific cut-off points. Moreover, if the middle class declined, can we identify potential causes? And to what extent do different welfare state regimes play a role in ensuring the vitality of the middle class?

We explore these questions and add to the literature by focusing on what happened in the middle of the income distribution by employing the EU-SILC (European Survey on Income and Living Conditions) data for our analysis. We incorporate the latest data of the EU-SILC for 2014 and also examine changes of the educational composition of the middle class. We further compute M-, first, second polarization curves, as proposed by Wolfson (1994) and examine changes in the income distribution by means of a polarization index put forward by Wolfson (1994). As pointed out by Alichi et al. (2016), who studied income polarization in the United States, it is of great importance to study and compute the polarization index also for other countries. We further examine possible drivers of a declining 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 the change in middle class by focusing on variations across different welfare state regimes.

Our analysis shows that the size of the middle class declined in 18 out of 26 European countries between 2004 and 2014. By examining the polarization curves, we find that in 12 countries the downsizing of the middle class is independent from the chosen cut-off points. The polarization index increased in all countries where a decline of the middle class was noted, with the exception of Greece. Hence, a hollowing out of the middle class is accompanied by a more polarized income distribution, i.e. more individuals moving into lower and higher income classes. In 11 out of the 18 countries where the size of the middle class declined, more people shifted into the lower tails of the distribution than into the upper tails. Moreover, our results are consistent with the findings of Pressman (2007) and Pressman (2010). We show that redistributive policy is the most important driver for the size of the middle class and that variation between countries is relatively large. Concerning the different welfare state regimes, we find that Social-Democratic countries have the biggest middle class, whereas the smallest middle class is found in Baltic countries.

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. Second, we analyse the effect of changing household structure 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 et al. (2014a), study those who belong to the middle of the income distribution, rather than a class in sociological terms. Also in this paper, we exclusively refer to the middle income class, when talking about the middle class. Various measurement approaches regarding the middle class 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 middle 60 percent (Easterly, 2001; Atkinson et al., 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 et al. (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. 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 lower and upper thresholds. Once more, there is a lack of consensus on which thresholds to use. A wide variety of definitions exist: Grabka et al. (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 et al. (1985) and Pew-Research-Center (2015) broadened the definition to 60-225% and 67-200%, respectively. Bosch et al. (2015) and Simonazzi et al. (2016) chose cut-off points of 60% and 200%. Again other scholars study

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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).
households with an income between 75% and 125%, when talking about the middle class (Thurow, 1987; Birdsall et al., 2000; Pressman, 2007; Pressman, 2010). 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. This is also the most common relative threshold used by authors in the book edited by Gornick et al. (2014b) about the middle class in affluent countries. 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 et al., 2013). This threshold assumes that households have a reasonable level of economic security, which is a major component of belonging to the middle class (Birdsall, 2010). However, we are aware that with annual income data we cannot capture the full extent of economic security. First, monthly income can be volatile over a 12-months period and it is possible that middle-class households experience poverty spells during the year. Another approach to define the lower threshold of the middle class was proposed by Lopez-Calva et al. (2014). They exploit panel data to establish predicted income associated with a 10% probability of falling into poverty, arguing that middle-class households should have enough income to protect themselves from becoming poor (for a more detailed description see Lopez-Calva et al. (2014)). Another important factor concerning economic security is wealth, which allows coping with economic hardships, such as unemployment and illness. Piketty (2014) defines “the middle class of wealth” as those between the bottom 50%, who have no or very little wealth and the top 10%, who typically own more than half of total wealth. A certain amount of wealth is needed to deal with economic contingencies. Weller et al. (2009) examine several middle class insecurity measures for the United States. They calculate the share of middle class families that have enough savings to cover an unemployment spell, a medical emergency (or both) and have financial wealth exceeding income of three months. The importance of personal wealth for economic security depends heavily on the welfare state. In countries with a generous welfare
state, savings are less important than in more liberal welfare states (Fessler et al., 2017). Economic security is also closely linked to job security. As Banerjee et al. (2008, p. 26) put it: “[n]othing seems more middle class than the fact of having a steady well-paying job.” Owing to the fact, that we use annual cross-sectional income data we cannot account for insecurity other than adding a margin of not being at immediate-risk-of-income-poverty.

The chosen thresholds permit us to examine the middle of the income distribution, bearing in mind its inevitable arbitrariness. In section 4.1.3 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 and methods

We use micro-level cross-sectional data for 26 European countries provided by the EU-SILC between 2004 and 2014.\textsuperscript{5} EU-SILC aims to ensure the quality and comparability of the data. The harmonized data set allows us to explore differences of the size of the middle class across European countries. Although the use of EU-SILC data offers many advantages, such as comparability among European countries, some remarks of caution are worth noting. Korinek et al. (2006) and Frick et al. (2011) find that middle-income households are more likely to participate in surveys. This leads to an overestimation of the size of the middle class in surveys, which is not a EU-SILC specific issue. Other limitations are rather EU-SILC specific. Owing to the fact that countries are free to choose the sampling design, some countries obtain income variables from administrative data, whilst other countries rely on the information given by the respondents. This limits the comparability between “register” and “survey” countries. Additionally, it is worth mentioning that in-kind benefits are not included in the EU-SILC. 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

\textsuperscript{5}For the total sample, we changed negative incomes to Zero in 9,600 cases. Moreover, income data for Germany is only available until 2013.
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.

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 et al. (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 population. 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 available to a household for spending and saving. 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 employee cash, pensions from individual private plans and cash benefits or losses from self-employment on the personal level as well as income from rental of a property or land, regular interhousehold cash transfer received, interests, dividends, profit from capital investment in uncorporated business and income received by people aged under 16 on the household level.⁶

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

⁶Note that factor income for Spain is available since 2005. For Greece, France, Italy, Latvia and Portugal it is available since 2006.
members into account. Each household member 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 - 34, 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.

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 et al. (2015) to cluster countries into six groups (see Table A.1). Compared to the standard classification of welfare state regimes of Esping-Andersen (2013), which only distinguishes between three, the categorization framework of Aristei et al. (2015) differentiates between six categories of welfare states. Due to the relative heterogeneity of the 26 European countries this paper analyses, we therefore choose the latter framework. 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 et al. (2015) is based on the Variety of Capitalism approach, which was initiated by Hall et al. (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.

— Table A.1 about here —
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. Figure A.1 shows the absolute change between 2004 and 2014 in percentage points. Moreover, the population share of the middle class in each country, including the European average (weighted and unweighted) for 2004 and 2014 is also shown. It is evident that the size of the middle class varies considerably across Europe. In 2004, on average (weighted) 40.4% of all respondents could be considered middle class in their respective countries. Turning to 2014, on average (weighted) a significant decline between 2004 and 2014 of 1.7 percentage points can be noted. The share of middle income population decreased in 18 countries, whereas it increased in 8 countries. The changes are not statistically significant (according to bootstrap confidence intervals (estimated change ± 2 × standard error based on 1,000 simulations) in the United Kingdom and Portugal (rise in middle class population share) and Greece, Finland, Norway, Netherlands and Belgium (fall in middle class population share). In the remaining 19 countries the increase/decrease is statistically significant. Poland experiences the most substantial rise, with 5.7 percentage points. The increase in the other countries ranges from 0.3 (Portugal) up to 2.9 percentage points (Ireland). Conversely, the largest decline of the middle class is observed in Germany (9.5 percentage points) followed by Sweden (6.7 percentage points) and Cyprus (5.2 percentage points). We notice large differences regarding the size of the middle class across Europe. The middle class ranges from below one third (Estonia, Lithuania, Latvia and Spain) up to greater than one-half (Czech Republic, Iceland and Norway) in 2014.

— Figure A.1 about here —

In countries where the middle class declined, it is worth examining whether individuals shift into the lower or upper ends of the income distribution. Therefore, we examine whether

11Accounting for the country’s population size.
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 analyse if more people moved up or down by comparing the changes of the lower and the upper income class. This is done by analysing the changes of individuals with an equivalised disposable household income above 125% (upper income class) and below 75% (lower income class) of the median. The results are shown in Figure A.2 and suggest upward mobility in 10 out of 26 countries.

In 18 countries where a decline in the middle class could be noted, 6 showed upward and 11 downward mobility. In Lithuania both the lower and the upper income class increased by 2.5 percentage points each. In Germany, for example, the upper class increased by 5.6 percentage points, whereas its lower class grew by 3.8 percentage points. As the middle class declines and the upper income class show a larger increase than the lower income class, Germany faces upward mobility. However, we cannot conclude an unequivocal trend of upward and downward mobility regarding a downsizing of the middle class.

As a next step, we analyse what happens in the 8 countries, where the middle class increases. Analysing Figure A.2, we see that in 4 out of those 8 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.

— Table A.2 about here —

4.1.2 Educational attainment of the middle class

So who is part of the middle class and how did the composition of the middle class change? In order to gain more insight of structural changes, we evaluate how the educational composition evolved between 2004 and 2014 across Europe. We divide individuals into three educational groups: low-educated, medium-educated and highly-educated. Individuals with a low-level of education comprises those, whose highest ISCED (International Standard Classification of Education) level does not surpass a lower-secondary education. Medium-education entails (upper) secondary education and post-secondary non-tertiary education, whereas individuals who attained tertiary education are categorized as highly-educated. In 2004, on average (weighted) almost half (44.1%) of all individuals belonging to the middle class are cate-
gorized as medium-educated, 40.2% did not go beyond lower-secondary education, whilst 15.8% have a tertiary degree. Across Europe, a vast educational expansion can be noted in the last 10 years. In all countries the proportion of highly-educated individuals rose. This trend is closely linked to demographic changes. Young people on average have a higher educational level than the older generation. The increasing share of individuals with a tertiary education is also reflected in the composition of the middle class. In 2014, the weighted average across all 26 countries of highly-educated individuals in the middle class increased to 21.6%. The share of low- and medium-educated individuals fell by 5.4 and 0.4 percentage points, respectively. Owing to the changing educational composition of the whole population, it is vital to look beyond mere changes of the educational composition of the middle class population. A falling share of low-educated persons in the middle class can be accompanied by a falling share of low-educated persons across the whole population. We therefore investigate the ratio between the share of the three educational groups in the middle class and compare it with the overall educational share of the whole population. For instance, in 2014 27.0% of the French population had a tertiary degree, whereas the share of highly-educated individuals in the middle class was 21.7%. The two values give us a ratio of 0.8, hence highly-educated individuals are under-represented in the middle class. A value greater than 1 indicates an over-representation of the respective educational group. The ratio for highly-educated individuals in France was 1.68 in the upper-income class and 0.47 in the low-income class in 2014. By the same token, we find that low-educated individuals are over-represented in the low-income class (1.46) and under-represented in the upper-income class (0.61). Individuals with low-education may well be married to someone with a higher educational attainment and therefore be financially well situated. We now turn to examining the change of the ratio between 2004 and 2014, which are shown in Figure A.3. In general the changes are more pronounced in the lower- and upper-income class than in the middle class. Therefore, it would be a mistake to neglect what is happening at the bottom and the top of the income distribution. We first evaluate what happened in the 18 countries, where we find a declining middle class. The ratio of low-educated individuals in the middle class decreased in half of these countries (Denmark, Estonia, Germany, Hungary, Lithuania, Latvia, Netherlands, Slovenia and Sweden). Besides Denmark, where the ratio of low-educated decreased also in the lower-income
class, in all other 8 countries low-educated individuals are more over-represented in the lower-income class than in 2004. In Austria, the middle class also decreased, whereas the ratio of low-education remained constant. However, we see that the ratio of low-educated individuals in the lower-income class increased from 1.55 in 2004 to 1.66 in 2014. At the same time, the ratio of low-educated individuals in the upper-income class declined from 0.54 to 0.43. In the remaining 7 countries where the middle class population share declined (Belgium, Cyprus, Finland, Greece, Italy, Luxembourg, Norway and Spain) the ratio of low-educated people increased in the middle class. Hence, no clear pattern can be detected concerning the lower-educated in the middle class. The same holds true for the countries where the middle class population share increased. Across all 26 countries, the ratio of low-educated individuals in the lower-income class increased in 16 countries (Austria, Belgium, Czech Republic, Estonia, Finland, France, Germany, Hungary, Lithuania, Latvia, Netherlands, Poland, Portugal, Slovakia, Slovenia and Sweden). On average (weighted) across Europe the ratio increased by 0.06 from 1.42 to 1.48. This findings suggests that it has become more difficult to belong to the middle class with a low-educational background. Regarding individuals with an (upper) secondary or post-secondary non-tertiary education, the ratio in the middle class has increased in almost all countries with a shrinking middle class. The exceptions are Belgium (constant ratio) and Denmark, Greece, Italy and Luxembourg (decreasing ratio). In the lower-income class (upper-income class), the ratio of medium-educated individuals increased (decreased) in all countries with a declining middle class, except for Norway and Luxembourg. In the 8 countries, where the share of the middle class population increased, we find that the ratio of medium-educated individuals increased in the lower and middle class in all countries besides Iceland and Ireland, where the ratio of medium-educated declined in the middle class. Overall, the ratio of medium-educated individuals slightly increased on average (weighted) by 0.02 to a ratio of 1.07. The ratio decreased in the upper-income class by 0.12, whilst it increased in the lower-income class by roughly the same amount. Now turning to the highly-educated individuals, we find that the ratio of highly-educated in the middle increased in 15 countries (Cyprus, Denmark, Estonia, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Spain, Slovenia and Sweden) with a declining middle class. This was accompanied by a falling ratio of highly-educated in the upper-income
class. In Austria and Germany, the ratio of highly-educated individuals in the middle class decreased, whereas the ratio remained constant in Finland. Germany is the only country across Europe where the ratio of highly-educated increased in the upper-income class. In Austria and Finland the ratio decreased in the upper-income class and increased in the lower-income class. For countries with a rising middle-class population share, the ratio of highly-educated in the middle class increased in all these countries (except the United Kingdom). This change is reflected in a falling ratio in the upper-income class and an increasing ratio in the lower-income class. In the United Kingdom only very small changes can be noted. Across all 26 countries, highly-educated are less over-represented in the upper-income class in 2014 than 10 years earlier, with the exception of Germany (ratio slightly increased) and the United Kingdom (no change). The weighted average ratio decreased by 0.10 to 1.67. In the lower-income and middle class, highly-educated individuals remain under-represented. However, the ratio increased in both income groups between 2004 and 2014.

Overall, the changes of the educational attainment are more notable in the lower- and upper-income class than in the middle. The analysis suggests that it has become more difficult for individuals with a low-education to belong to the middle and upper-income class. Those with a medium-educational background are more evenly spread across the three income groups than the two other educational groups. In 2014, medium-educated individuals form the largest group in the middle class in most countries. The importance of medium-educated slightly grew in the middle class. However, it appears that it has become more difficult to belong to the upper-income class with a below tertiary education than in the beginning of the 2000s.

4.1.3 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 et al. (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.\textsuperscript{12} 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.4 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.\textsuperscript{13} Additional two lines are demarcated at 0.8 and 1.2 in Figure A.4. Since the most narrow definition of the middle class determines the cut-off points at 80\% and 120\% of the median income\textsuperscript{14}, 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 2014 compared to 2004 is unambiguously smaller in 12 countries (Austria, Cyprus, Denmark, Estonia, Finland, Germany, Hungary, Luxembourg, Netherlands, Slovenia, Spain and Sweden). The middle class unambiguously increased in 4 countries (Poland, Portugal, Slovakia and the United Kingdom). No such statement can be made in the case of the remaining 10 countries, due to the fact that the M-curves of the two years cross. However, in Czech Republic and Iceland the size of the middle class rises for almost all commonly chosen thresholds. The opposite case can be noted for Italy and Lithuania, where a decline of the

\textsuperscript{12}In order to derive M-curves, we normalize the income distribution $F$ of the respective country such that the median equals one. The median of an income distribution $F$ is defined as $m_F$. Moreover we define $R = [z, \bar{z}]$, such that $0 \leq z \leq 1 \leq \bar{z}$ is satisfied. The middle class $M(F; R)$ is the share of population belonging to the income range $R$.

\[ M_f(R) = M_f(z) + M_f(\bar{z}), \]

where $M_f(z)$ is the “lower middle class” and $M_f(\bar{z})$ is the “upper middle class”. When depicting $M_f(R)$ we obtain the M-curve, which can consequently be compared to M-curves of different countries or time periods.

\textsuperscript{13}Cf. Ravallion (2010).

\textsuperscript{14}Bosch et al. (2015) differentiate between the lower (60\% – <80\%), middle (80\% – <120\%) and upper (120\% – <200\%) middle class.
middle class for most cut-off points is evident.

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.\textsuperscript{15} 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.\textsuperscript{16}

For instance, when examining the middle 60%, the spread is computed by subtracting the normalized income of the household at the 20\textsuperscript{th} percentile from the normalized income of the household at the 80\textsuperscript{th} 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.4 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.4 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. Owing to the fact that the first polarization curve is closely connected to the M-curves, we find that the spread unambiguously increased in the

\textsuperscript{15}See Foster et al. (2010) for a more detailed discussion.
\textsuperscript{16}To derive the first degree of polarization curve, we first define $Q = [q, \bar{q}]$ for a given population range, which satisfies $q \leq 0.5 \leq \bar{q}$. The middle class index $M$ allows for different $Q$s for a given $R$, due to different income distributions. We now define $S(F; Q)$ that measures the width of the income range (spread) for the given population $Q$.

$$S_f(Q) = \hat{y}(\bar{q}) - \hat{y}(q),$$

where $\hat{y}$ is the normalized income of the person at the $q$\textsuperscript{th} percentile.
12 countries where the size of the middle class unambiguously decreased. The same holds true for the 4 countries with decreased spread (increased middle class) and the remaining countries where no clear conclusion can be derived.

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 curve, 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. This measure is more sensitive to changes occurring around the median income. 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.4 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 12 countries (Austria, Cyprus, Denmark, Estonia, Finland, Germany, Hungary, Lithuania, Luxembourg, Netherlands, Spain and Sweden), whereas income polarization unambiguously decreased in 4 European countries (Czech Republic, Poland, Slovakia and the United Kingdom). For the remaining countries, no such conclusions can be derived, because the second degree polarization curves cross.

— Figure A.4 about here —

The specific case of Greece has to be emphasized: first, it is worth pointing out that the equivalised disposable median income decreased by 20.1% nominally and by 35.6% in real terms between 2004 and 2014. The nominal and real median income increased in all other countries. In real terms, the median also decreased in Cyprus (-14.1%), Hungary (-11.7%), Iceland (-44.4%), Italy (-9.4%), Luxembourg (-3.2%), Portugal (-1.1%) and the United Kingdom (-15.1%) between 2004 and 2014.

\[ B_f(q) = \int_{q}^{0.5} S_f(p) \, dp, \]

for \( 0 \leq q \leq 1. \)

\[ B_f(q) = \int_{q}^{0.5} S_f(p) \, dp, \]

for \( 0 \leq q \leq 1. \)

\[ B_f(q) = \int_{q}^{0.5} S_f(p) \, dp, \]

for \( 0 \leq q \leq 1. \)

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for \( 0 \leq q \leq 1. \)

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for \( 0 \leq q \leq 1. \)

\[ B_f(q) = \int_{q}^{0.5} S_f(p) \, dp, \]

for \( 0 \leq q \leq 1. \)
2004 and 2009. Afterwards, due to the economic crisis, the nominal median income decreased by 37.1% between 2009 and 2014. In real terms, the median income decreased by 41.1% in the aftermath of the crisis. Second, the M-curves show that in the lower half of the income distribution, the curve of 2004 lies above the one of 2014. 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 2014 for the bottom 50% but smaller for the top 50%. The Greek case highlights the limitations of relative middle class thresholds during economically turbulent times. Matsaganis et al. (2014) and Andriopoulou et al. (2018) among others show that for Greece, the rise of relative poverty-rates after 2009 was modest. However, when the poverty rate is anchored at 60% of the median equivalised disposable income (inflation-adjusted) of 2009, the proportion of population that falls below the poverty threshold of 2009 was over 45% in 2013 (Matsaganis et al., 2014). Whether income is most appropriate for examining distributional concerns in period of economic downturns also remains disputed (Sen, 1992). Kaplanoglou et al. (2018) examine the impact of the economic crisis and austerity measures on changes in consumption inequality for Greece. Concerning the middle class, defined as households between 75% and 125% of equivalised median expenditure, they find that in 2008, 37% of the population are middle class. In 2013, the middle class population share drops to 28% when the thresholds are anchored at the cut-off points of 2008 (inflation-adjusted). A more troublesome finding is that around 58% of the population are considered belonging to the low-expenditure group when the thresholds are anchored. A similar picture emerges from our calculations. When the middle class cut-off thresholds are anchored at 2007, the middle class population share decreases to 30.4% (compared to 34.0% with floating cut-off points). However, 55.5% of the Greek population falls below the lower middle class cut-off point of 2007 (compared to 31.8% otherwise). Andriopoulou et al. (2018) state that the main driver for changes concerning the structure of inequality and poverty was the significant increase in unemployment. In 2014, almost one third of the Greek population lived in households with at least one unemployed household member. Before the crisis, the share amounted to 11.9%. Hence, in times of economic crisis and in particular when real income levels are falling, floating thresholds are not very informative and should
be carefully interpreted.

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:

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

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.\(^\text{19}\) 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 2014 in 17 countries and decreased in 9 countries, as shown in Figure A.5. 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.

\(--\text{ Figure A.5 about here }--\)

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. 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 group is of great 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.

\(^\text{19}\) Similarly, the Gini index does not provide any information, whether the Lorenz curves of two distributions cross.
4.2.1 Household composition

Table A.2 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 2014, 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 population share of the middle class in 2014. We cannot observe what the size of the middle class would have been in 2014 with a constant household composition of 2004, since the household composition changed. Therefore, this analysis is referred to as counterfactual.

The results show that, on average, changing household structures do not account for changing middle class share. As can be seen from Table A.2, the weighted average is -1.7 percentage points for the actual and -1.7 percentage points for the counterfactual change of the size of the middle class. On a country level, we observe the most significant result in Slovenia. For the latter we see that with a constant household type composition the middle class would increase by 0.3 percentage points compared to a decrease of 1.5 percentage points between 2004 and 2014. Moreover, assuming a constant household type composition shows that the middle class in Poland and Slovakia would increase by 1.3 percentage points less compared to the original sample. Thus, we see that the actual change of the middle class in these countries is largely affected by changes in the household composition.

--- Table A.2 about here ---

The middle class in 2014 is calculated as follows: Middle class 2014 = \sum_{i=1}^{n} (Prop_{2004} \times MC_{2014})$, where Prop_{2004} is the proportion of the middle class in household group $i$ in 2004 of the total population and MC_{2014} is the relative size of the middle class in household group $i$. 

20The middle class in 2014 is calculated as follows: Middle class 2014 = \sum_{i=1}^{n} (Prop_{2004} \times MC_{2014})$. Where $Prop_{2004}$ is the proportion of the middle class in household group $i$ in 2004 of the total population and $MC_{2014}$ is the relative size of the middle class in household group $i$. 

20
4.2.2 Redistributive policy

To analyse the effect of redistributive policy, we examine the size of the middle class, defined as individuals with a factor income between 75% and 125% of the median factor income in Figure A.6 and the governmental influence, measured as the difference between the middle class population share based on disposable and factor household income. Figure A.7 shows the change of governmental influence. Looking at the results it can be noted that, as expected, in all countries the middle class would be significantly smaller without government redistribution. On average (weighted), the middle class would have been 20.3 percentage points smaller in 2014 based on factor income. Between countries, the influence of government spending and taxes on the size of the middle class varies significantly. In Denmark the middle class would have been around 25.3 percentage points smaller, whereas the difference in Estonia only amounts to 10.3 percentage points. The result shows the vast impact of redistributive policy on the income distribution, the size of the middle class and the variation across European countries.

We would expect that when the middle class based on factor income increases, the middle class based on disposable income, also increases. Evidence suggests that this is not always the case. In 4 countries the middle class would have increased in terms of factor income, but decreased with respect to disposable income (Sweden, Norway, Lithuania and Estonia). For instance, the middle class in Lithuania declined by -4.8 percentage points based on disposable income, but increased by 0.5 percentage points based on factor income. However, one has to be careful here because the increase according to factor income is statistically not significant in the 4 countries. In the remaining 4 countries, where the middle class based on factor income increased (Slovakia, Poland, France and Czech Republic), the middle class based on disposable income also increased. The changes for factor income are statistically significant for Slovakia and Poland. In Slovakia the rise of the middle class was more pronounced in terms of factor income than in disposable incomes. The examples of Hungary, Latvia, Luxembourg and Germany show that also the decline can be more visible regarding

21 Factor income comprises gross employee cash, pensions from individual private plans and cash benefits or losses from self-employment on the personal level as well as income from rental of a property or land, regular interhousehold cash transfer received, interests, dividends, profit from capital investment in unincorporated business and income received by people aged under 16 on the household level.
the disposable income than factor incomes. This is most notable in Germany, where the fall of the middle class amounts to 9.5 percentage points, when the disposable income definition is used, whereas the decline amounts to 2.2 percentage points otherwise. In 9 countries (Italy, Belgium, Finland, Slovenia, Austria, Netherlands, Greece, Spain and Cyprus) the middle class (disposable income) decreased less than the decline would have been, based on factor income. Hence, governmental redistribution mitigated increasing inequality based on factor income. The analysis shows that redistributive policy can affect the evolution of the middle class in a positive but also in a negative way. As Figure A.7 shows, the governmental influence increased in 16 countries, in particular in countries where the size of middle class population based on factor income decreased. Only in Poland, the share of middle class population based on factor income as well as the governmental influence both increased (and both changes are statistically significant). Hence, in these two countries the increase of the middle class population share is more pronounced based on disposable income than on factor income due to redistributive measures. Overall, the importance of redistributive policy should be highlighted. Even if 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 population share of the middle class in all countries.

— Figure A.6 about here —

— Figure A.7 about here —

4.2.3 The non-elderly middle class

Figures A.8, A.9 and A.10 help 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 turn to examining the redistributive effects on a subsample for non-elderly persons. Thus, we calculate the middle class
class based only on individuals which live in households with household heads younger than 60 years old.

Figure A.8 shows the development of the non-elderly middle class for disposable income. On average (weighted) the middle class was 40.2% in 2004 and decreased by 1.8 percentage points by 2014. The most significant decrease of the middle class is similar to the initial sample: Germany (8.8 percentage points) is followed by Cyprus (7.7 percentage points) and Sweden (5.5 percentage points). The non-elderly middle class increased most in Poland (7.2 percentage points). The case of Latvia is worth mentioning: the non-elderly middle class population share increased by 1.7 percentage points, whereas for all households, it declined by 3.7 percentage points. In general, in almost all countries the change of the middle class size, based on disposable income, is more pronounced for the non-elderly as compared to the whole population.

Figure A.9 shows the results for non-elderly households when only considering factor income. Between 2004 and 2014 the non-elderly middle class regarding factor income declined on average (weighted) by around 1.6 percentage points. The most pronounced decrease in the middle class population share occurred in Spain (9.0 percentage points), Cyprus (8.8 percentage points) and Ireland (4.9 percentage points). Conversely, in Poland the non-elderly middle class increased by 8.4 percentage points.

In 2014, the average (weighted) non-elderly middle class population share based on disposable income was 10.7 percentage points higher than without state intervention. The difference is significantly lower, when we consider the entire sample (19.8 percentage points). In all 26 countries we find that government redistribution is lower for non-elderly households than for the overall sample. The most distinct result is obtained for Hungary in 2014, where the redistributional effect between all households (22.2 percentage points) and non-elderly households (10.3 percentage points) is 11.9 percentage points. Therefore, we can conclude that government social security and retirement programs for the elderly are an important driver for the size of the middle class.

Figure A.10 shows the change of the governmental influence on the non-elderly middle class population share. Governmental influence is measured as the difference between the size of the middle class based on disposable income and the size based on factor income. We
see that on average (weighted) the governmental redistribution decreased by 0.8 percentage points. In 15 out of 26 countries the governmental influence decreased, most notably in Sweden (8.7 percentage points), Hungary (6.5 percentage points) and Germany (4.8 percentage points).

— Figure A.8 about here —
— Figure A.9 about here —
— Figure A.10 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 a prosperous middle class we analyse the influence of welfare state regimes. To do so, we use a framework provided by Aristei et al. (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.11(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 2014 the largest middle class can be observed in the Social-Democratic countries (SDC), Continental European Economies (CEE) and Eastern European countries (EEC), whereas the smallest can be observed in the Baltic countries (BC) and Mediterranean countries (MC). The range between the biggest and smallest middle class has slightly increased from 15.3 percentage points in 2004 to 15.8 percentage points in 2014. Moreover, it is interesting that the middle class only increased in the EEC (3.1 percentage points) and the liberal market economies (LME) (1 percentage point), whereas in all other country groups the middle class decreased. The most significant decrease can be observed in the BC (4.4 percentage points).
Analysing the evolution of the middle class based on factor income the picture in Figure A.11(b) is slightly different. In 2014, the biggest middle class can still be found in Social-Democratic countries, whilst the smallest middle class now can be observed in liberal countries. Furthermore, the middle class in the Mediterranean countries decreased steadily and shrunk by 4.2 percentage points between 2006 and 2014. 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 stayed constant between 2004 and 2014. With regard to the evolution of the middle class based on factor income, we find that Baltic countries faced the most drastic decrease in their middle class in the aftermath of the economic crisis.

Figure A.11(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 government influence. Redistributive policy was most effective in Social-Democratic countries where government redistribution increased the middle class by 25.2 percentage points in 2004. Baltic countries performed worst and increased their middle class only by 11.4 percentage points.

Over the period of observation the situation changed considerably. Social-Democratic countries reduced their impact on the middle class (-3.1 percentage points), while Mediterranean countries (+3.7 percentage points) significantly increased their influence. However, in 2014 the Baltic countries still show the lowest performance and increase their middle class by 10.3 percentage points, while Social-Democratic (22.1 percentage points) and Continental European economies (22.1 percentage points) show the highest increase of their middle class due to government redistribution. Finally, we observe a huge difference in terms of redistribution among the observed country groups, which seems to considerably affect the size of the middle class.
4.3.2 The income share of the middle class

Focusing only on the share of middle class individuals 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.12(a) shows the development of the income share (disposable income) of the middle class per country group from 2004 to 2014.\textsuperscript{22} 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.11. In Social-Democratic countries the middle class obtains the largest share of total income with 37.9\% in 2014. Conversely, the middle class in the Baltic countries only receives 26.7\% of total income. The development between 2004 and 2014 shows that the income share of the middle class declined most in the Social-Democratic countries (5.0 percentage points), whereas Eastern European countries show the largest rise of their income share (4.2 percentage points). Looking at the share of total factor income, as shown in Figure A.12(b), a similar impression emerges. Social-Democratic countries still obtain the largest income share of their middle class (21.1\%) and liberal economic countries the smallest (13.2\%). However, the evolution over the period of observation shows an interesting result. The income share of the Mediterranean countries middle class lost 5.5 percentage points, whereas it increased strongest by 5.3 percentage points in the Eastern European countries. The highest income share is found in Eastern European countries (20.4) in 2014. In general we see a highly significant correlation between the size of the middle class and its total income share.\textsuperscript{23} Figure A.12(c) displays how much government influence changed the income share of the middle class per country group over time. This is measured by the difference between the income share of the middle class based on disposable income (Figure A.12(a)) and the income share of the middle class based on factor income (Figure A.12(b)).\textsuperscript{24} Thus, we are able to indicate the difference which results due to government transfers and taxes on the income share of the middle class. At the beginning of the observation period of the certain country

\textsuperscript{22}For calculating the income share of the middle class we leave out negative incomes.
\textsuperscript{23}For 2014: Correlation value = 0.99, p-value = 0.00003906
\textsuperscript{24}It is worth noting that we do not calculate how much the middle class, defined as disposable income gains through government redistribution, but how much the income share varies depending on whether the middle class definition is based on disposable or factor income.
group the impact of redistributive policy was highest in Social-Democratic countries (21.8 percentage points) and lowest in the Baltic countries (10.5 percentage points). The impact of government influence on the income share of the middle class increased considerably in the Mediterranean countries (3.6 percentage points), while it declined significantly in Social-Democratic countries (2.9 percentage points). However, in 2014 the highest effect due to redistributive policy on the income share of the middle class can be found in Central European countries (19.4 percentage points), while the Baltic countries show the poorest performance (10.5 percentage points).

— Figure A.12 about here —

4.3.3 Income polarization across country groups

When grouping the countries into country groups, we find that the polarization index is lowest in SDC and highest in BC. Overall, the findings indicate that polarization increased in 4 out of 6 country groups. Polarization only decreased in the LME and in the EEC.

— Figure A.13 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 2014 both indices increase, as can be seen in Figure A.14(a). In Figure A.14(b) the starting point 2004 is taken as the base year (Index = 100). We observe that the polarization index increased by 2.9% between 2004 and 2014, whereas the Gini index in 2014 is close to the base year and only increased by 0.9%.\(^{25}\) We conduct the same analysis on a country group level. The results are

\(^{25}\)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 1.5%, whilst the rise of the polarization index amounts to 3.8%.
illustrated in Figure A.15. We find that the patterns of the two indices are relatively similar at a country group level, as depicted in Figure A.15(a). By closely examining Figure A.15(b), we note that both Gini and polarization increased notably in SDC and CEE. Both indices also increased in BC and MC. In LME and EEC both Gini and polarization decreased.\textsuperscript{26}

— Figure A.14 about here —

— Figure A.15 about here —

To summarise, income polarization according to the polarization index 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, as can be seen from Figure A.15(b) where the Gini always lies above the polarization index of the respective country group. Thus, our results show that income polarization has increased more than inequality as measured by the Gini index. This suggests 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 2014. Its main conclusion is that the size of the middle class declined in 18 out of 26 European countries. Governmental transfers and taxes have a great impact on the share of middle-class households and vary considerably across countries and welfare state regimes. On average, redistributive policies double the size of the middle class. In particular, we identified that social security and retirement programs for elderly have a large impact on the size of the middle class. Overall, Social-Democratic countries have the largest middle class, while the smallest share of middle-class households are found in Baltic countries. Therefore, we conclude that institutional characteristics of Social-Democratic countries such as universal benefits, the aim of achieving full-employment, progressive pecuniary

\textsuperscript{26}Again, we conduct the same analysis by taking 2005 as base year, however the patterns do not change.
benefits (except for family allowance) tend to be beneficial for the size of the middle class. However, also Social-Democratic countries experienced a downsizing of the middle class in recent years, most notably in Sweden. Last, our evidence points towards a rising income polarization across Europe, which is accompanied by a declining middle class. 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 it is worthwhile to further study income polarization in-depth, owing to the fact that it has substantial implications for the middle class and its well-being.

Our findings are limited by the choice of a purely income-based definition, even though it is essential as a starting point to capture what has been happening in the middle of the income strata across Europe. Future research could broaden the definition by accounting for financial assets, job security, occupation and/or education. This would ideally enhance our understanding of which households are affected by increasing income polarization and how fiscal policies can counteract further polarization.

\[^{27}\text{For more information about institutional characteristics of Social-Democratic and Central European economies see Esping-Andersen et al. (2011).}\]
### Tables and Figures

#### Table A.1 — Country groups

<table>
<thead>
<tr>
<th>Country Groups</th>
<th>Abbreviations</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baltic countries</td>
<td>BC</td>
<td>Estonia, Lithuania, Latvia</td>
</tr>
<tr>
<td>Continental European economies</td>
<td>CEE</td>
<td>Austria, Belgium, France, Germany, Norway, The Netherlands, Luxembourg</td>
</tr>
<tr>
<td>Eastern European countries</td>
<td>EEC</td>
<td>The Czech Republic, Hungary, Poland, Slovakia, Slovenia</td>
</tr>
<tr>
<td>Liberal market economies</td>
<td>LME</td>
<td>Iceland, Ireland, United Kingdom</td>
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<tr>
<td>Mediterranean countries</td>
<td>MC</td>
<td>Cyprus, Spain, Greece, Italy, Portugal</td>
</tr>
<tr>
<td>Social-Democratic countries</td>
<td>SDC</td>
<td>Denmark, Finland, Sweden</td>
</tr>
</tbody>
</table>

*Notes:* Germany is not in the framework of Aristei et al. (2015). Thus, we cluster this country with regard to the specific characteristics of the country groups.
## Table A.2 — Middle class decline and household strings between 2004 and 2014

<table>
<thead>
<tr>
<th>Country</th>
<th>original sample$^a$</th>
<th>constant household strings$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>-1.5</td>
<td>-1.8</td>
</tr>
<tr>
<td>Belgium</td>
<td>-1.2</td>
<td>-0.5</td>
</tr>
<tr>
<td>Cyprus</td>
<td>-5.2</td>
<td>-4.8</td>
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<tr>
<td>Czech Republic</td>
<td>1.9</td>
<td>1.3</td>
</tr>
<tr>
<td>Germany</td>
<td>-9.5</td>
<td>-9.4</td>
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<tr>
<td>Denmark</td>
<td>-3.1</td>
<td>-2.7</td>
</tr>
<tr>
<td>Estonia</td>
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</tr>
<tr>
<td>Spain</td>
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<td>-2.4</td>
</tr>
<tr>
<td>Finland</td>
<td>-0.8</td>
<td>-0.9</td>
</tr>
<tr>
<td>France</td>
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<td>1.6</td>
</tr>
<tr>
<td>Hungary</td>
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<td>-4.9</td>
</tr>
<tr>
<td>Ireland</td>
<td>2.9</td>
<td>3.8</td>
</tr>
<tr>
<td>Iceland</td>
<td>2.0</td>
<td>1.9</td>
</tr>
<tr>
<td>Italy</td>
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<td>-0.9</td>
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<tr>
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<td>-3.4</td>
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<td>Lithuania</td>
<td>-4.8</td>
<td>-4.2</td>
</tr>
<tr>
<td>Luxembourg</td>
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<td>-4.5</td>
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<td>-1.2</td>
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<td>0.1</td>
</tr>
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<td>4.4</td>
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<td>Portugal</td>
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<td>0.7</td>
</tr>
<tr>
<td>Sweden</td>
<td>-6.7</td>
<td>-6.9</td>
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<tr>
<td>Slovenia</td>
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<td>0.3</td>
</tr>
<tr>
<td>Slovakia</td>
<td>2.4</td>
<td>1.1</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.9</td>
<td>0.7</td>
</tr>
<tr>
<td>Average unweighted</td>
<td>-1.6</td>
<td>-1.5</td>
</tr>
<tr>
<td>Average weighted</td>
<td>-1.7</td>
<td>-1.7</td>
</tr>
</tbody>
</table>

Source: Own calculations, EU-SILC

Notes: Column (2) presents how the middle class has changed in the original sample between 2004 and 2014, whereas column (3) illustrates how the middle would have changed if we assume a constant household composition after 2004. To calculate a constant household composition we standardize household structures across countries by using household strings, an approach provided by Fessler et al. (2014).

$^a$ change in percentage points
**Figure A.1 — Change of the middle class population share from 2004 to 2014 (disposable income, in percentage points)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Middle Class Share 2004 (%)</th>
<th>Middle Class Share 2014 (%)</th>
<th>Change 2004-2014 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>33.5</td>
<td>48.3</td>
<td>14.8</td>
</tr>
<tr>
<td>Ireland</td>
<td>33.5</td>
<td>40.8</td>
<td>7.3</td>
</tr>
<tr>
<td>Slovakia</td>
<td>46.8</td>
<td>47.5</td>
<td>0.7</td>
</tr>
<tr>
<td>Iceland</td>
<td>50.7</td>
<td>32.8</td>
<td>-17.9</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>48.1</td>
<td>13.0</td>
<td>-35.1</td>
</tr>
<tr>
<td>France</td>
<td>42.2</td>
<td>41.9</td>
<td>-0.3</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>34.3</td>
<td>42.0</td>
<td>7.7</td>
</tr>
<tr>
<td>Portugal</td>
<td>35.3</td>
<td>52.0</td>
<td>16.7</td>
</tr>
<tr>
<td>Greece</td>
<td>34.8</td>
<td>28.0</td>
<td>-6.8</td>
</tr>
<tr>
<td>Finland</td>
<td>45.9</td>
<td>49.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Norway</td>
<td>51.9</td>
<td>48.4</td>
<td>-3.5</td>
</tr>
<tr>
<td>Netherlands</td>
<td>46.9</td>
<td>41.2</td>
<td>-5.7</td>
</tr>
<tr>
<td>Italy</td>
<td>35.9</td>
<td>42.2</td>
<td>6.3</td>
</tr>
<tr>
<td>Belgium</td>
<td>41.5</td>
<td>42.7</td>
<td>1.2</td>
</tr>
<tr>
<td>Austria</td>
<td>45.8</td>
<td>51.0</td>
<td>5.2</td>
</tr>
<tr>
<td>Slovenia</td>
<td>48.5</td>
<td>50.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Austria</td>
<td>45.8</td>
<td>50.0</td>
<td>4.2</td>
</tr>
<tr>
<td>Sweden</td>
<td>50.5</td>
<td>51.9</td>
<td>1.4</td>
</tr>
<tr>
<td>Germany</td>
<td>48.3</td>
<td>48.4</td>
<td>0.1</td>
</tr>
</tbody>
</table>

**Source:** Own calculations, EU-SILC

**Notes:** The middle class is defined as individuals living in households between 75% and 125% of the national median equivalised disposable household income. The bootstrap confidence intervals (estimated change ± 2 × standard error) are based on 1,000 simulations. Not statistically significant changes are displayed in light grey. Countries are ranked largest to smallest middle class population share in 2014.
Figure A.2 — Upward and downward mobility

<table>
<thead>
<tr>
<th>Country</th>
<th>Change (lower, upper)</th>
<th>Upward mobility</th>
<th>Downward mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>(−0.9, 0.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greece</td>
<td>(−1.0, 1.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td>(−2.0, 1.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia</td>
<td>(−0.6, 2.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latvia</td>
<td>(0.5, 0.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luxembourg</td>
<td>(−1.1, 3.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>(−0.5, 1.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td>(1.6, 0.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovakia</td>
<td>(−0.6, 1.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portugal</td>
<td>(0.3, −0.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyprus</td>
<td>(2.0, −2.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td>(1.9, 1.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>(−0.3, −0.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>(0.4, 2.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>(0.7, 0.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td>(2.5, 2.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td>(−1.5, −1.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>(−2.9, −2.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>(2.4, 2.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td>(−0.3, 1.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>(−0.9, −0.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>(−0.1, 1.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td>(−0.5, 1.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>(3.8, 5.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>(0.4, 2.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iceland</td>
<td>(−2.3, 0.3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Own calculations, EU-SILC
Notes: The figure shows the difference between the changes of upper class and lower class population shares. Changes of lower and upper class are indicated in parentheses (lower, upper). Statistically significance based on bootstrap confidence intervals (± 2 × standard error, 1,000 simulations) is indicated with a *. Upward mobility is the case when the values are greater than Zero, for downward mobility the value must be below Zero. The upper class is defined as individuals living in households with more than 125% of the national median equivalised disposable household income, whereas the lower class is defined as individuals living in households below 75% of the national median equivalised disposable household income. Results may show differences due to rounding.
**Figure A.3 — Changes of the educational composition between 2004 and 2014**

<table>
<thead>
<tr>
<th>Country</th>
<th>High-educated</th>
<th>Medium-educated</th>
<th>Low-educated</th>
<th>Upper</th>
<th>Middle</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
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<td>Belgium</td>
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<td>Czech Republic</td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

| Denmark          |                |                  |              |       |        |       |
| Estonia          |                |                  |              |       |        |       |
| Finland          |                |                  |              |       |        |       |
| France           |                |                  |              |       |        |       |

| Germany          |                |                  |              |       |        |       |
| Greece           |                |                  |              |       |        |       |
| Hungary          |                |                  |              |       |        |       |
| Iceland          |                |                  |              |       |        |       |

*Notes:*
- The table shows the changes in the educational composition between 2004 and 2014 for various countries.
- The educational levels are categorized as High-, Medium-, and Low-educated.
- The changes are represented numerically, indicating improvements or declines in the educational composition.

*Source:* Data from the given reference.
<table>
<thead>
<tr>
<th></th>
<th>Luxembourg</th>
<th>Netherlands</th>
<th>Norway</th>
<th>Poland</th>
<th>Lower</th>
<th>Middle</th>
<th>Upper</th>
<th>Lower</th>
<th>Middle</th>
<th>Upper</th>
</tr>
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<tr>
<td>High-educated</td>
<td>0.80</td>
<td>-0.33</td>
<td>-0.30</td>
<td>-0.33</td>
<td>0.51</td>
<td>-0.39</td>
<td>-0.36</td>
<td>0.59</td>
<td>-0.36</td>
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<tr>
<td>Medium-educated</td>
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<td>-0.23</td>
<td>-0.24</td>
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<td>-0.29</td>
<td>0.58</td>
<td>-0.29</td>
<td>-0.27</td>
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<td>Low-educated</td>
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<td>-0.40</td>
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<td>-0.43</td>
<td>-0.44</td>
<td>0.65</td>
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<tr>
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<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
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<td>Portugal</td>
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<tr>
<td>High-educated</td>
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<td>-0.26</td>
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<td>-0.31</td>
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<td>-0.24</td>
<td>-0.24</td>
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<td>-0.29</td>
<td>0.73</td>
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<tr>
<td>Low-educated</td>
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<td>-0.33</td>
<td>-0.33</td>
<td>0.77</td>
<td>-0.38</td>
<td>-0.38</td>
<td>0.82</td>
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<tr>
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<td>Upper</td>
<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
<td></td>
</tr>
<tr>
<td>Slovenia</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>High-educated</td>
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<td>-0.24</td>
<td>-0.24</td>
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<td>-0.29</td>
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<tr>
<td>Medium-educated</td>
<td>0.61</td>
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<td>-0.23</td>
<td>-0.23</td>
<td>0.66</td>
<td>-0.28</td>
<td>-0.28</td>
<td>0.71</td>
<td>-0.28</td>
<td>-0.28</td>
</tr>
<tr>
<td>Low-educated</td>
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<td>-0.31</td>
<td>-0.31</td>
<td>0.75</td>
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<td>0.80</td>
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<tr>
<td></td>
<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-educated</td>
<td>0.80</td>
<td>-0.22</td>
<td>-0.22</td>
<td>-0.22</td>
<td>0.85</td>
<td>-0.27</td>
<td>-0.27</td>
<td>0.90</td>
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<td>-0.27</td>
</tr>
<tr>
<td>Medium-educated</td>
<td>0.58</td>
<td>-0.18</td>
<td>-0.18</td>
<td>-0.18</td>
<td>0.63</td>
<td>-0.23</td>
<td>-0.23</td>
<td>0.68</td>
<td>-0.23</td>
<td>-0.23</td>
</tr>
<tr>
<td>Low-educated</td>
<td>0.67</td>
<td>-0.31</td>
<td>-0.31</td>
<td>-0.31</td>
<td>0.72</td>
<td>-0.36</td>
<td>-0.36</td>
<td>0.77</td>
<td>-0.36</td>
<td>-0.36</td>
</tr>
</tbody>
</table>

35
### Table: Distribution of Income by Education Level

| Source: Own calculations, EU-SILC |
| Notes: The middle class is defined as individuals living in households between 75% and 125% of the national median equivalised disposable household income. Lower-income class are those below 75% and upper-income class those above 125% of the national median equivalised disposable household income. Values in parentheses indicate the ratio (share of education group in respective education group divided by share of education group of the total population) of 2004. |

<table>
<thead>
<tr>
<th></th>
<th>Sweden</th>
<th>United Kingdom</th>
<th>Average unweighted</th>
<th>Average weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-educated</td>
<td>0.56</td>
<td>0.99</td>
<td>1.54</td>
<td>0.08</td>
</tr>
<tr>
<td>Medium-educated</td>
<td>0.68</td>
<td>0.62</td>
<td>0.83</td>
<td>0.12</td>
</tr>
<tr>
<td>Low-educated</td>
<td>0.87</td>
<td>0.62</td>
<td>1.06</td>
<td>0.02</td>
</tr>
</tbody>
</table>

### Figure A.4 — M-curves, First and Second Polarization Curves in Germany

**Source:** Own calculations, EU-SILC

**Notes:** This figure presents M-curves, First and Second Polarization Curves. M-curves illustrate the mass around the median income. The first polarization curve shows the spread, while the second polarization curve indicates the degree of bipolarity of the income distribution.
**Figure A.5** — Change of the polarization index between 2004 and 2014 (in index points)

Source: Own calculations, EU-SILC
Notes: The polarization index provided by Wolfson (1994) ranges from 0 (no polarity) to 100 (bipolarity). Countries are ranked lowest to highest polarization index in 2014.

**Figure A.6** — Change of the middle class population share from 2004 to 2014 (factor income, in percentage points)

Source: Own calculations, EU-SILC
Notes: The middle class is defined as individuals living in households between 75% and 125% of the national median equivalised factor household income. The bootstrap confidence intervals (estimated change ± 2 × standard error) are based on 1,000 simulations. Not statistically significant changes are displayed in light grey. Countries are ranked largest to smallest middle class population share in 2014. Spain: 2005; Greece, France, Italy, Latvia and Portugal: 2006.
**Figure A.7** — Change of the governmental influence on middle class population share from 2004 to 2014 (in percentage points)

Source: Own calculations, EU-SILC  
Notes: Governmental influence is measured as the difference between the middle class based on disposable and factor household income. The middle class is defined as individuals living in households between 75% and 125% of the national median equivalised disposable/factor household income. Countries are ranked largest to smallest governmental influence in 2014. Spain: 2005; Greece, France, Italy, Latvia and Portugal: 2006 for governmental influence.

**Figure A.8** — Change of the non-elderly middle class population share between 2004 and 2014 (disposable income, in percentage points)

Source: Own calculations, EU-SILC  
Notes: The middle class is defined as individuals living in households between 75% and 125% of the national median equivalised disposable household income; The bootstrap confidence intervals (estimated change ± 2 × standard error) are based on 1,000 simulations. Not statistically significant changes are displayed in light grey; Countries are ranked largest to smallest middle class population share in 2014.
Figure A.9 — Change of the non-elderly middle class population share between 2004 and 2014 (factor income, in percentage points)

Source: Own calculations, EU-SILC
Notes: The middle class is defined as individuals living in households between 75% and 125% of the national median equivalised factor household income; The bootstrap confidence intervals (estimated change ± 2 x standard error) are based on 1,000 simulations. Not statistically significant changes are displayed in light grey; Countries are ranked largest to smallest middle class population share in 2014; Spain: 2005; Greece, France, Italy, Latvia and Portugal: 2006

Figure A.10 — Change of the governmental influence on non-elderly middle class population share between 2004 and 2014 (in percentage points)

Source: Own calculations, EU-SILC
Notes: Governmental influence is measured as the difference between the middle class based on disposable and factor household income. The middle class is defined as individuals living in households between 75% and 125% of the national median equivalised disposable/factor household income; Countries are ranked largest to smallest governmental influence in 2014; Spain: 2005; Greece, France, Italy, Latvia and Portugal: 2006 for governmental influence
Figure A.11 — 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

Source: Own calculations, EU-SILC
Notes: This figure illustrates the evolution of the size of the middle class among country groups. According to a framework provided by Aristei et al. (2015), countries are clustered into country groups with regard to similar socio-economic policies and institutions. The middle class is defined as individuals living in households between 75% and 125% of the national median equivalised disposable household income.
FIGURE A.12 — The evolution of the income share 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

Source: Own calculations, EU-SILC
Notes: This figure illustrates the evolution of the income share of the middle class among country groups. According to a framework provided by Aristei et al. (2015), countries are clustered into country groups with regard to similar socio-economic policies and institutions. The middle class is defined as individuals living in households between 75% and 125% of the national median equivalised disposable household income.
Figure A.13 — The evolution of the polarization index on country group level

Source: Own calculations, EU-SILC.

Notes: This figure illustrates the evolution of the polarization index among country groups. The polarization index provided by Wolfson (1994) ranges from 0 (no polarity) to 100 (bipolarity). The higher the polarization index, the smaller is a country group’s middle class. According to a framework provided by Aristei et al. (2015), countries are clustered into country groups with regard to similar socio-economic policies and institutions.
**FIGURE A.14 — The evolution of the Gini and polarization index**

![Graph](image1)

**Variable** — Gini • Polarization

(a) Index

(b) Index (2004=100)

*Source:* Own calculations, EU-SILC

*Notes:* This figure illustrates the evolution of the weighted average Gini and polarization index of the 26 countries. The polarization index provided by Wolfson (1994) ranges from 0 (no polarity) to 100 (bipolarity). The higher the polarization index, the smaller is the middle class.

**FIGURE A.15 — The evolution of the Gini and polarization index on country group level**

![Graph](image2)

**Country groups** — BC • EEC • MC

(a) Index

(b) Index (2004=100)

*Source:* Own calculations, EU-SILC

*Notes:* This figure illustrates the evolution of the Gini and polarization index among country groups. The polarization index provided by Wolfson (1994) ranges from 0 (no polarity) to 100 (bipolarity). The higher the polarization index, the smaller is the middle class. According to a framework provided by Aristei et al. (2015), countries are clustered into country groups with regard to similar socio-economic policies and institutions.
Figure A.16 — M-curves, First and Second Polarization Curves

(a) Austria

(b) Belgium
(c) Cyprus

(d) Czech Republic
(e) Denmark

(f) Estonia
(g) Greece

(h) Spain
(i) Finland

(j) France
(k) Hungary

(l) Ireland
(m) Iceland

(n) Italy
(q) Latvia

(r) Netherlands
(s) Norway

(t) Poland
(u) Portugal

(v) Sweden
(w) Slovenia

(x) Slovakia
United Kingdom

(y) United Kingdom
References


