Occupational Social Class and Earnings Inequality in Europe: A Comparative Assessment

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ORIGINAL RESEARCH

Occupational Social Class and Earnings Inequality in Europe: A Comparative Assessment

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Abstract
While there is renewed interest in earnings differentials between social classes, the contribution of social class to overall earnings inequality across countries and net of compositional effects remains largely uncharted territory. This paper uses data from the European Union Statistics on Income and Living Conditions to assess earnings differentials between social classes (as measured by ESeC) and the role of between-class inequality in overall earnings inequality across 30 European countries. We find that there is substantial variation in earnings differences between social classes across countries. Countries with higher levels of between-class inequality tend to display higher levels of overall earnings inequality, but this relationship is far from perfect. Even with highly aggregated class measures, between-class inequality accounts for a non-negligible share of total earnings inequality (between 15 and 25% in most countries). Controlling for observed between-class differences in composition shows that these account for much of the observed between-class earnings inequality, while in most countries between-class differences in returns to observed compositional variables do not play a major role. In all these respects we find considerable variation across countries, implying that both the size of between-class differences in earnings and the primary mechanisms that produce these class differences vary substantially between European countries.

1 Introduction

Earnings inequality has risen across many rich countries over recent decades, and this has been a major contributory factor in increasing overall income inequality (e.g. Nolan & Valenzuela, 2019; OECD, 2011). Yet, there are stark cross-national differences in levels of inequality across countries (Nolan et al., 2019). Various factors have been identified to explain the variation over time and across countries, notably the combination of

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and interaction between globalisation and technological change together with differences in institutional and policy designs (for a review, see Nolan et al. (2019)). An important contribution of the sociological literature in this realm has been to investigate the relationship between occupational class and rising income inequality. Studies on the relationship between social class and earnings have focused on trends over time in single countries, including in the US (Weeden et al., 2007; Wodtke, 2016, 2017; Zhou & Wodtke, 2019), the UK (Williams, 2013, 2017), and Italy (Albertini, 2013). Albertini et al. (2020) is a rare comparative study, looking at how between-class differentials in incomes evolved in European countries from 2005 to 2014. Mauritti et al. (2016) examine the relationship between social class and income decile across 24 European countries in 2012. All of these studies confirm the continued capacity of occupational classes to structure economic inequalities as well as they once did, thereby validating the analytical usefulness of the class concept for understanding socio-economic inequality.

While previous studies have focused for the most part on the relationship between class and earnings in select countries, much less is known about cross-national variation in how class differentials contribute to overall income and earnings inequality. For example, Le Grand and Tåhlin (2013) provide a comparative study of class-earnings differentials in Europe, but they do not relate class inequality to overall earnings inequality. Albertini et al. (2020) do assess the contribution of between-class earnings gaps to overall earnings inequality, but their analysis is limited to a small number of countries and they primarily focus on trends over time and whether those are in line with hypotheses about occupational polarization. Hence, what is missing to date is a broader comparative analysis of the variation in class differentials in earnings and their role in overall earnings inequality. How much do earnings differentials between classes vary across a larger set of countries and how is that related to overall earnings inequality? This is particularly important in light of the extensive research across the social sciences over the last decade focusing on cross-national differences in income inequality and the consequences for outcomes including health, wellbeing, social trust, solidarity, and political outcomes (Huijsmans et al., 2020; Neckerman & Torche, 2007; Paskov & Dewilde, 2012; Rözer et al., 2016; Wilkinson & Pickett, 2010). Moreover, higher overall income inequality has been linked in some studies with stronger class inequalities in outcomes (Grasso et al., 2019).

However, comparing countries by overall levels of income inequality does not tell us much about the nature of inequality and the extent to which it is structured by social class (Goldthorpe, 2010). Inequality in household incomes or in individual earnings could be higher in one country than another primarily due to greater dispersion within classes or on the other hand to wider gaps between them. These represent very different situations. Our aim is to assess how much the role of class in earnings inequality differs across different country contexts and the extent to which greater inequality between the classes and higher overall earnings inequality coincide. We probe the extent to which location in a specific class means something different in one country than another in terms of earnings gaps vis-à-vis other classes, the extent to which this can be 'explained' by observable factors, and how it relates to overall earnings dispersion. This clearly matters for how one thinks about social class and how it intersects with income inequality. If we find for example that the earnings gap between working and middle classes is particularly wide in the countries with high levels of overall earnings inequality, that has implications for understanding the relationhips between social class and attitudes, behaviours and outcomes across socio-economic domains ranging from health to politics. In essence, in such cases inequality might be associated with social and political outcomes via class differentials, in other cases inequality might affect such outcomes via channels other than social class. Cross-national

variations in the earnings gaps between social classes also have more practical implications for analyses of class effects that ignore the varying gaps in earnings between classes that we document in this paper.

This paper thus seeks to add to the literature by studying the varying contribution of earnings inequality between classes to overall earnings inequality across a large set of European countries. In addition to substantially extending the number of countries for which class differentials and overall earnings inequality are mapped, we go beyond existing comparative studies (e.g. Albertini et al., 2020; Le Grand & Tåhlin, 2013) by comparing the relationship between class inequality and overall earnings inequality before and after controlling for two kinds of observable factors. The first is differences in the composition of social class in terms of a set of socio-economic variables associated with earnings, namely education, work experience, gender, health status, immigration status and household type. The second is differences in the "returns" to these variables across social classes, that is, in the class-specific earnings effects of these socio-economic variables. (The term "returns" would usually be used in a human capital context to refer to the earnings reward for having additional education or experience, but here we employ it as a convenient umbrella term to simply denote the direction and strength of the conditional association between earnings and each of these variables). These sets of observable factors point to different institutional channels that affect the class-earnings relationship, while the cross-national variation in how they affect the counterfactual level of between-earnings inequality is particularly helpful in understanding how the nature of observed between-class earnings inequalities varies across countries. In addition, these compositional differences can also be expected to account for some of the cross-national variation in between-class inequality.

Our empirical analysis employs high-quality earnings data for 30 European countries from the 2018 wave of the European Union Statistics on Income and Living Conditions (EU-SILC), which is a representative sample of the population living in private households. We first establish the extent of differences in median earnings between social classes identified using the European Socio-Economic Classification (ESeC), the schema most often employed in comparative European research. We then assess the contribution these class inequalities make to overall earnings inequality. Finally, we develop and apply an analytical approach that allows us to assess the extent to which differences across classes in composition in terms of a set of socio-economic variables at individual and household level and in earnings returns to those variables underpin the contribution of between-class differences to overall earnings inequality. This allows us to establish whether cross-national differences in earnings inequality by class are mainly determined by compositional factors or factors related to differential returns. Given the significance of gender in the earnings-class nexus, we validate the key findings by gender-specific analyses.

We find first that there is substantial variation across countries in the size of earnings differences between social classes. Countries with higher levels of between-class inequality tend to display higher levels of overall earnings inequality, but this relationship is far from perfect. Even with highly aggregated class measures, between-class inequality accounts for a non-negligible share of total earnings inequality (between 15 and 25% in most countries). Controlling for observed between-class differences in composition reduces the variation in between-class earnings inequality across countries considerably, while in most countries differences in earnings returns to those observables do not appear to play a major role. These patterns also apply to females and males separately.

Data and methods are set out in Sect. 2. Section 3 sets out the extent of between-class earnings differentials alongside levels of overall earnings inequality across European countries. Section 4 examines the extent to which cross-country differences in between-class

earnings inequality are related to differences in class composition in terms of observed individual and household socio-economic variables and in earnings returns to those variables. Section 5 concludes with a discussion of the implications of our findings.

2 Data and Methods

2.1 The Data: EU-SILC 2018

To assess earnings differentials between social classes and overall earnings dispersion across a broad range of countries, we make use of the EU Statistics on Income and Living Conditions (EU-SILC) microdata. EU-SILC is the main source for comparative research into earnings and income inequality in Europe. The 2018 wave (release of Spring 2020) contains information on 30 European countries including all EU Member States, plus Norway, Serbia Switzerland and the United Kingdom. Slovakia has been dropped from this study as the occupations variable is missing from the dataset for this country. EU-SILC follows a format of 'guided output-harmonisation', which implies that there is a predetermined list of commonly defined target variables, while there is quite some variation across countries in sample design, mode of data collection (especially the use of survey data vs. register data), and questionnaire design (Atkinson et al., 2017; Goedemé & Zardo Trindade, 2020). In most countries, all household members aged 16 and over are interviewed, while in Denmark, Finland, the Netherlands, Norway, Sweden and Slovenia a part of the questionnaire is only completed by selected respondents. We follow the procedures proposed in Goedemé (2013) to take EU-SILC's complex sample design as much as possible into account when estimating standard errors and confidence intervals.

In this study we focus on the population in paid employment, aged 18–64 and with earnings above zero in the income reference year. The income reference year is the calendar year before the survey year (i.e. 2017). Exceptions are Ireland (the 12 months preceding the interview) and the United Kingdom (the current year). Our subsample of interest for which we have both information on social class and earnings varies between 2500 (Denmark and Sweden) and 17,000 individuals (Italy).

2.2 The measurement of earnings and social class

In what follows we discuss in some detail the variables included in our analysis. The dependent variable is gross earnings in the income reference year, which includes cash, near-cash and non-cash employee income as well as profits and losses from self-employment.[1] Observations with total gross earnings of zero or below are excluded, while at the top of the distribution we winsorize at the 999th permille. The earnings variable reflects both the number of hours worked and pay per hour, so both part-time working and time spent not in work during the year will affect total earnings. This measure of earnings must be distinguished from on the one hand the measures of household income including other income sources and after tax that would be used in analysing household income inequality, and on the other the hourly earnings measure that would usually be employed in estimating

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[1] Non-cash income primarily refers to the use of a company car for private purposes, but also includes other non-cash earnings.

human capital models. Hourly earnings in the income reference year cannot be robustly constructed from the information available in EU-SILC. However, the annual earnings variable has advantages for current purposes. Differences in pay per hour, in hours worked per week, and in weeks worked in the year are all likely to be highly structured in social class terms, so being able to capture them in this earnings measure is valuable in analysing earnings gaps between the classes. Gross earnings are a major component of household income, but the latter is also affected by how individuals group together in households as well as by the redistributive impact of social protection transfers and direct taxes. Unpacking class gaps in disposable household income is a highly worthwhile exercise but even more complex than the analysis of individual gross earnings on which we concentrate here, and on which it could build.

The conceptualisation of social class we employ is based on occupations, as reflected in the EGP class schema developed by Erikson et al. (1979) for comparative research. Occupational classifications define social classes by looking at attributes of a position in the labour market that are independent of the person holding the position (rather than, for example, seeking to group together people sharing identities, interests, social and cultural resources, and lifestyles). The central focus is on employment relations in the labour market (as distinct from measures aiming to capture the social status or prestige associated with different occupations). Employers face contractual hazards in the labour market, especially with regard to two main problems: work monitoring and human asset specificity. The former arises when the employer cannot assess whether the employee is working and acting in the employer's interest, while the latter refers to the extent to which a job requires job-specific skills. These in combination motivate the broad differentiation of employment relations between the situation of employers, the self-employed and employees, and the further distinction between those in a service relationship (the service class or professionals) and labour contracts (see also Erikson & Goldthorpe, 1992; Goldthorpe, 2007, 2010). Given our focus here on class and current earnings, it is important to note that while this theoretical framework predicts a marked relationship between class and employment security, pension rights and the steepness of age-earnings profiles, the expectations with respect to variation in current earnings are by no means as clear (see for example Goldthorpe & McKnight, 2006).

This theoretical framework as reflected in the EGP class schema provided the basis for the European Socio-Economic Classification (ESeC) subsequently developed for Eurostat (Rose & Harrison, 2007, 2010). Here we operationalise social class using ESeC as it reflects the most influential theoretical base informing occupation-based class analysis in Europe, is specifically designed for such comparative analysis, and is by far the measure most commonly employed for that purpose. The related occupation-based class schema proposed by Oesch (2006a, b, 2013) is intended to reflect the transformation of employment structures over recent decades, on the basis that with the decline of manufacturing and growth of services previously homogeneous groups (such as professionals or the 'middle class') have become more internally differentiated. This schema is thus intended especially to allow horizontal differentiation to be studied, while as Oesch (2006b) notes vertical/hierarchical differences – on which our analysis is centrally focused—are captured by varying degrees of advantage attaching to the employment relationship as in Erikson and Goldthorpe (1992). Empirical evidence comparing the predictive power of the Oesch schema with more conventional schema is also still scant, as Barbieri et al. (2020) point out (though see Lambert & Bihagen, 2014). Such a comparison in terms of earnings patterns would be valuable but beyond the scope of the present paper, which concentrates on the ESeC measure for the reasons set out. In that context it is also worth noting the arguments

	ESeC class	9-class	3-class
Table 1 Collapsing ESeC from 9 to 3 classes *Source*: Rose and Harrison (2010)	High salariat	1	1+2
	Lower salariat	2	
	Higher white collar	3	3+4+5+6
	Petit bourgeois	4	
	Small farmers	5	
	Higher grade blue collar	6	
	Lower white collar	7	7+8+9
	Skilled manual	8	
	Semi-/non-skilled (routine occupations)	9	

put forward by Maloutas (2007) that ESeC is less than satisfactory for Southern European countries because a relatively large proportion of the workforce are not employees or operate within small firms where internal hierarchies are very limited. These are issues that certainly complicate the application and interpretation of class schema in a comparative context and need to be kept in mind.

The key ingredients of social class as measured by ESeC are employment status, size of the firm (in the case of self-employed), supervisory status (in the case of employees), and occupation. Given that in EU-SILC 2018 the International Standard Classification of Occupations (ISCO 2008) is available at the two-digit level, we use a simplified version of the original ESeC based on this two-digit ISCO code.[2] While in most countries this allows between 40 and 43 occupational groups to be distinguished, occupation is only available at a much more aggregated level in the case of Germany (9 groups), Malta (10 groups) and Slovenia (10 groups). This leads to an over-estimation of the share of the Higher white collar and Higher salariat classes, at the cost of the Lower salariat class' share in these countries (see Goedemé and Zardo-Trinidade, 2020 for more details). Since we only consider observations with earnings above zero, we exclude respondents who never worked or are in long-term unemployment.

Although our main focus is on the non-hierarchical nine-class version of ESeC, for presentational purposes we also use the hierarchical three-class version.[3] As shown in Table 1, we follow Rose and Harrison (2010) in collapsing the nine-class version of ESeC into a hierarchical three-class schema, labelling these the 'Salariat', 'Intermediate' and 'Working' classes.

Using this nine-class schema derived from ESeC, Fig. 1 depicts the share of each class in the working population across the thirty European countries we are covering. The size of

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[2] The social class variable was constructed using an adapted version of the Stata do-file published on the GESIS website, (https://www.gesis.org/en/gml/european-microdata/eu-silc, last accessed 05/11/2019). In contrast to the original file, we first classify the self-employed into those with employees versus those without employees, and look at the size of the firm only for the former group. Furthermore, we also include family workers (for details see Author, 2019, 2020). Our do-file can be downloaded from <<deleted for peer review purposes>>.

[3] Probing the relationship between class and earnings helps to illuminate the circumstances of different classes relative to each other irrespective of whether those are framed in hierarchical terms; none the less, the extent to which observed earnings differentials are consistent with hierarchical framings is of particular interest.
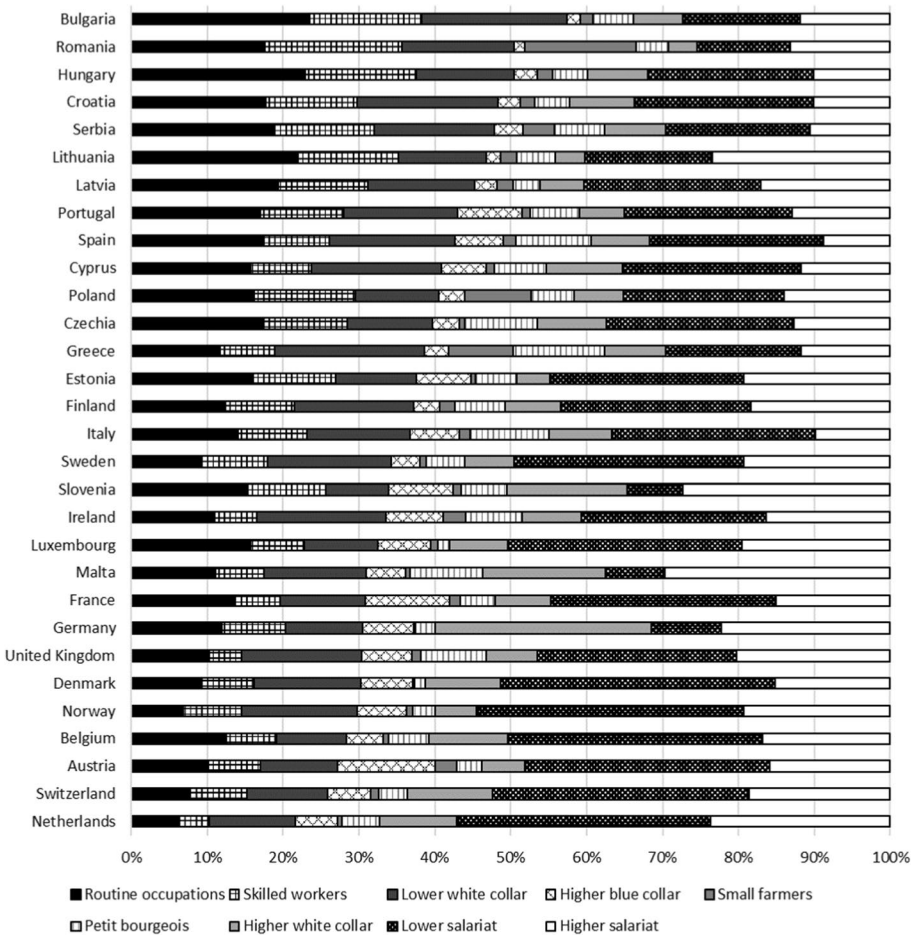
Fig. 1 The distribution of social classes in 30 European countries (%), EU-SILC 2018. Note: Countries ordered by the joint share of the Routine occupations, Skilled workers and Lower white collar class. Germany, Malta and Slovenia: based on first digit ISCO-08. *Source*: EU-SILC 2018 (release Spring 2020), computations by the authors

the working class is relatively small in Western Europe and largest in Eastern Europe, ranging from around 20% in the Netherlands to over half of the active population in Bulgaria. In contrast, the size of the salariat class is 30% or below in Greece, Serbia, Bulgaria and Romania and close to or above 50% in the Nordic countries, Austria, Belgium, Luxembourg, the Netherlands and Switzerland. The intermediate class is largest in Greece (and Germany), where it accounts for about 35% of the active population, and smallest in Norway, Latvia and Lithuania where it is about 15%. Also the relative share of the more refined nine classes that make up these three classes varies considerably across countries.

2.3 The (Un)adjusted Mean Log Deviation

We make use of the mean logarithmic deviation (MLD) to assess the overall size of between-class inequality and the contribution that between-class differentials make to overall earnings inequality between individuals in different countries. This approach is widely employed for decomposition analyses of income inequality because it is additively decomposable into between-group and within-group components, has various theoretically attractive properties, and is relatively sensitive to differences across groups/countries in the tails of the distribution. Furthermore, as we will explain below, it has the additional helpful property that one can use it to re-estimate the level of between-group inequality controlling for various factors in order to gain more insight into the degree to which between-class earnings differences are a function of other observable factors, such as the composition of social classes and differences in returns to education and other socio-economic variables. The supplementary material presents evidence that country rankings when using other inequality indices, such as the Theil index and the Gini coefficient, both for overall earnings inequality and between-class inequality are very consistent with the MLD-based results.

The overall MLD can be computed as follows:

$$MLD = \frac{1}{N} \sum_{i=1}^{N} \ln \left(\frac{\bar{y}}{y_i} \right). \tag{1}$$

In other words, it is equal to the average logarithm of the ratio of average earnings (y bar) and the earnings of each member of the target population (y_i). The higher the value, the higher the level of inequality. In our data, the MLD of earnings ranges between 0.13 and 0.37. The MLD is additively decomposable into between and within-group inequality. When identifying nine classes c in the population, and s standing for the share of each class in the population, the MLD can be decomposed as follows:

$$MLD = \left[\ln(\bar{y}) - \sum_{c=1}^{9} s_c * \ln(\bar{y}_c) \right] + \left[\sum_{c=1}^{9} s_c * \ln(\bar{y}_c) - \sum_{c=1}^{9} s_c \overline{\ln(y)}_c \right]. \tag{2}$$

The first two terms represent between-group inequality, whereas the second two terms represent the weighted average of the MLD within each group, i.e. the contribution of within-group inequality to overall inequality.

In addition, we estimate the counterfactual between-group MLD in which we 'adjust' the MLD for observable factors that contribute to between-class differences in earnings.[4] These observable factors can be subdivided into two groups: (1) the differences in composition of the nine classes in terms of measured variables associated with higher versus lower earnings[5]; (2) differences between classes in the "returns" to those variables, using that term in the sense we explained early on and elaborate on now. Both factors may contribute

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[4] This approach is inspired by Kitagawa (1955), Blinder (1973) and Oaxaca (1973), which we extend to compute a counterfactual mean log deviation of earnings inequality between social class.

[5] Please note that the cross-national variation in compositional effects is driven both by the extent to which the size of compositional differences between social classes varies across countries, and overall cross-national differences in returns to education and other observed variables, which may strengthen or mitigate the degree to which compositional differences of social classes contribute to between-class inequalities. The supplementary appendix provides details on the bivariate association between these variables and both social class and earnings.

to an increase or a decrease of between-class earnings inequality. To filter out the contribution of these factors, insofar they can be identified with the available variables, we fit two OLS regressions which allow us to tease out the contribution of factor (1) versus factor (2) (the number of observations, design degrees of freedom and R^2 of these regressions can be found in the supplementary material). In the first regression, we include a dummy for each social class, a term for each covariate, as well as an interaction term for each class with this covariate. With 'class 1' as the reference category, this can be written as:

$$earnings = \beta_0 + \beta_{12}class_2 + \cdots + \beta_{19}class_9 + \beta_2 x_2 + \cdots$$
$$+ \beta_z x_z + \beta_{i22}x_2 class_2 + \cdots + \beta_{i29}x_2 class_9 + \cdots \qquad (3)$$
$$+ \beta_{iz2}x_z class_2 + \cdots + \beta_{iz9}x_z class_9 + u$$

with *class* being dummy variables for each social class, $x_2 \ldots x_z$ representing a list of covariates, $b_2 \ldots b_{iz9}$ the accompanying list of regression coefficients, and the i subscript indicating the regression coefficient for the interaction terms between each social class and the covariates. In addition, we estimate the same regression model, but now excluding the interaction terms between social class and the covariates:

$$earnings = \beta_0 + \beta_{12}class_2 + \cdots + \beta_{19}class_9 + \beta_2 x_2 + \cdots + \beta_z x_z + u \qquad (4)$$

By not including interaction terms of the covariates and the social class dummies, we estimate the 'average' association between earnings and the covariates, taking all classes together. Subsequently, we create two counterfactual estimates of the MLD of between-class earnings inequality. We do so by first making use of the estimated regression coefficients to 'predict' overall average earnings and average earnings in each class, under the assumption that the average value for each of the covariates is equal to the average in the target population of each country, i.e. under the assumption that the average composition of each class is the same as the average in the population, and subsequently plugging these predicted average earnings into the first two terms of Eq. 2.[6] In other words:

$$\bar{y}_{ac} = \beta_0 + \beta_{1c}class_c + \beta_2 \bar{x}_2 + \cdots + \beta_z \bar{x}_z + \beta_{i2c}\bar{x}_2 class_c + \beta_{izc}\bar{x}_z class_c \qquad (5)$$

with $b_0 \ldots b_{izc}$ estimated on the basis of Eq. 3 corresponds to the adjusted or counterfactual average earnings y of class c where we only adjust for differences in average composition of each social class. Similarly, making use of the regression coefficients estimated with Eq. 4, and dropping the interaction terms from Eq. 5, results in a counterfactual estimate of average earnings in each class, in which we additionally 'equalize' returns to the observed compositional variables across social classes. Thus, we can estimate the adjusted average earnings of each class in both scenarios, while the weighted average of all classes corresponds to the counterfactual overall average earnings. These values are subsequently used to estimate an adjusted measure of between-class earnings inequality in accordinace with the first two terms of Eq. 2., generating two counterfactual estimates of between-class earnings inequality. Comparing these values with the original MLD provides insight into the relative contribution to between-class earnings inequality of differences between the classes in average composition in observed variables versus differences in returns to those

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[6] We use the statistical package Stata for the analysis. In this software package estimating the counterfactual can be easily done by using the *margins* postestimation command (with the *atmeans* and *grand* option) and subsequently using *nlcom* to estimate the counterfactual MLD in accordance with the first two terms of Eq. 2. The Stata do-files are available from <<deleted for peer review>>.

compositional variables, and more generally into the extent to which these factors taken together allow us to account for between-class earnings differentials.

To estimate these adjusted measures of between-class inequality, we include the following variables that are typically associated with earnings:

Hours worked. Estimated proportion of full-year full-time hours worked (*FYFTE*). Each month for which the respondent reports having worked full-time (FT) is counted as 1/12, with months working part-time counted proportionately based on reported typical hours worked per week at the time of the interview, the only hours measure collected in the survey.

Education. Highest level of education is measured in three categories, which are added as dummy variables: (1) lower secondary and below; (2) higher secondary and post-secondary, non-tertiary; (3) tertiary education.[7]

Potential work experience. Number of years since the start of the first regular job.[8] Due to this variable, we do not include age in our models as the two are highly correlated.

Gender. Approximated by sex, in two categories (female/male).

Health status. Whether or not person reported feeling (very) limited in the activities they usually do because of health problems for at least the past six months;

Immigration status. This is measured by whether someone was born outside the country.[9] This variable is not included in Bulgaria, Hungary, Poland and Romania due to a low overall prevalence and zero prevalence of immigrants in some social classes in these countries.

Household type. We include three continuous variables (without interaction): the number of children below the age of 18, the number of dependent adults (earning less than 5% of national median earnings in the income reference year), and the number of adults with earnings in the household.

In some countries the number of missing cases in our target sample on these variables is relatively high, including in Denmark (50%), Sweden (17%), and the United Kingdom (37%), and to a lesser extent Belgium (5%), the Netherlands (4%) and Finland (4%), with some variation by social class, especially in Finland, Norway and the Netherlands. Furthermore, given that we can only estimate the counterfactual between-class mean log deviation controlling for compositional effects (but not between-class differences in returns) when there is some variation on each (category of each) variable within each social class in the sample, social classes that account for less than 1.5% of the population at working age in paid employment have been excluded from the analysis of counterfactual between-class earnings. This includes Small farmers in all countries except for Austria, Bulgaria, Croatia, Finland, Greece, Hungary, Ireland, Latvia, Lithuania, Poland, Romania, Sweden and Spain;

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[7] The measurement of educational attainment in a comparative framework faces a variety of challenges, including the appropriate categorisation of institional features specific to individual countries and the fact that vocational training is more deeply embedded in some than others, so the consequences of having/not having what is categorised as tertiary education may well differ. These are general problems in the comparative literature which this paper cannot seek to address but it is important to be aware of them.

[8] This is intended not to count part-time employment while a student as 'regular first job', but would include self-employment.

[9] EU-SILC also provides information on whether someone is a citizen of the country in which they are living; we use the country of birth definition because the legal frameworks regulating access to citizenship vary widely across countries which hampers comparability, as argued by (Fusco et al., 2021); they also demonstrate that the figures for immigrants based on country of birth in EU-SILC mirror official statistics from other sources published by Eurostat to a high degree.

Table 2 Earnings inequality between social classes and overall, mean log deviation, EU-SILC 2018 *Source*: EU-SILC 2018 (release Spring 2020), computations by the authors

Country		Earnings inequality between 9 classes		Overall earnings inequality		Between-class as a % of overall earnings inequality, 9 classes		Between-class as a % of overall earnings inequality, 3 classes	
		MLD		MLD		%		%	
Hungary	(HU)	0.026	(0.004)	0.258	(0.013)	10.2	(1.4)	9.2	(1.3)
Czech Republic	(CZ)	0.030	(0.002)	0.158	(0.004)	19.3	(1.1)	16.0	(0.9)
Belgium	(BE)	0.033	(0.003)	0.180	(0.008)	18.4	(1.2)	14.7	(0.9)
Norway	(NO)	0.033	(0.002)	0.197	(0.008)	17.0	(1.1)	13.9	(1.0)
Sweden	(SE)	0.034	(0.003)	0.197	(0.010)	17.5	(1.2)	13.7	(1.0)
Denmark	(DK)	0.035	(0.009)	0.193	(0.022)	18.4	(2.9)	11.3	(1.5)
Italy	(IT)	0.035	(0.002)	0.266	(0.005)	13.2	(0.8)	11.6	(0.6)
Estonia	(EE)	0.038	(0.003)	0.263	(0.008)	14.6	(1.0)	12.4	(0.9)
Greece	(EL)	0.038	(0.002)	0.262	(0.007)	14.5	(0.7)	11.8	(0.6)
Croatia	(HR)	0.038	(0.003)	0.189	(0.006)	20.0	(1.2)	17.0	(1.1)
Serbia	(RS)	0.040	(0.004)	0.181	(0.008)	22.3	(1.7)	14.3	(1.4)
Finland	(FI)	0.042	(0.003)	0.212	(0.008)	19.6	(1.2)	16.8	(1.1)
Poland	(PL)	0.042	(0.002)	0.212	(0.005)	19.7	(0.9)	13.3	(0.7)
Slovenia	(SI)	0.045	(0.003)	0.200	(0.007)	22.6	(1.5)	17.5	(1.3)
Netherlands	(NL)	0.047	(0.003)	0.267	(0.009)	17.6	(1.1)	14.8	(1.0)
Switzerland	(CH)	0.051	(0.004)	0.294	(0.011)	17.3	(1.1)	14.6	(1.0)
Lithuania	(LT)	0.054	(0.005)	0.301	(0.012)	18.0	(1.5)	14.4	(1.3)
Malta	(MT)	0.054	(0.004)	0.213	(0.011)	25.4	(1.7)	24.5	(1.7)
Austria	(AT)	0.055	(0.004)	0.319	(0.011)	17.4	(1.0)	15.5	(0.9)
Germany	(DE)	0.055	(0.003)	0.313	(0.007)	17.7	(0.7)	15.7	(0.7)
Spain	(ES)	0.058	(0.003)	0.333	(0.008)	17.5	(0.9)	15.9	(0.8)
France	(FR)	0.059	(0.005)	0.282	(0.010)	20.9	(1.3)	18.4	(1.2)
Latvia	(LV)	0.062	(0.005)	0.273	(0.009)	22.6	(1.4)	20.1	(1.3)
Cyprus	(CY)	0.068	(0.005)	0.266	(0.008)	25.7	(1.4)	23.9	(1.3)
Bulgaria	(BG)	0.073	(0.010)	0.365	(0.018)	20.0	(1.9)	18.7	(1.6)
Luxembourg	(LU)	0.074	(0.006)	0.288	(0.013)	25.6	(1.7)	24.4	(1.6)
Portugal	(PT)	0.075	(0.004)	0.277	(0.007)	26.9	(1.1)	26.3	(1.1)
United Kingdom	(UK)	0.079	(0.004)	0.341	(0.007)	23.0	(0.8)	19.5	(0.7)
Ireland	(IE)	0.089	(0.013)	0.370	(0.026)	24.1	(2.3)	19.4	(1.9)
Romania	(RO)	0.134	(0.011)	0.316	(0.019)	42.5	(2.1)	21.6	(1.4)

Countries ordered from low to high between class inequality with 9 classes. Standard errors between brackets

as well as the Petit bourgeoisie in Denmark and the Higher blue collar class in Romania. To assess the potential impact of both limitations on the findings of our study, in the results section below, we show both the MLD of between-class earnings in the total sample (Table 2) and in the restricted sample that is used for the counterfactual scenario (Fig. 5).
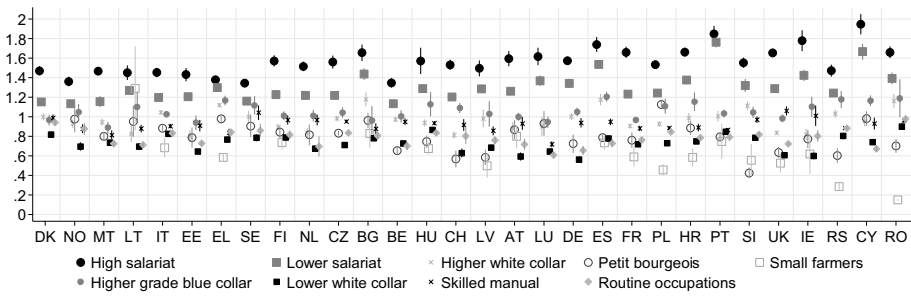
Fig. 2 Median earnings by social class, expressed as a proportion of national median earnings, people at active age and currently in paid employment with non-zero earnings in the income reference year, nine-class schema EU-SILC 2018. Note: Countries sorted by the difference between the highest and lowest median earnings in the country. Values not shown for categories with fewer than 60 observations (mostly Small farmers). 95% confidence intervals. *Source*: EU-SILC 2018 (release Spring 2020), computations by the authors

This shows that, overall, the impact of these restrictions is very small in the great majority of countries, with the exception of Sweden, Denmark and Finland, where between-class earnings inequality is about 10% lower in the restricted sample (i.e. a reduction in the between-class MLD of between 0.002 and 0.004), while the cross-country rank correlation coefficient between the between-class MLD in the total sample and in the restricted sample is 99.5. Given these results, we believe it is rather unlikely that there would be a substantial bias in the estimated size of the reduction in between-class inequality in the restricted sample as compared to the size of the reduction that we would observe in the complete sample, and especially in the broader cross-national pattern that we observe. Due to the small sample size of Denmark, it is excluded from the counterfactual analysis by gender.

3 Between-Class Earnings Differentials And Overall Earnings Inequality

Figure 2 shows the median earnings in each of the nine social classes as a proportion of the overall median earnings in each country without controlling for observable factors. The countries are ordered by the spanwidth between the class with the highest and the class with the lowest median earnings. In all countries the median earnings of the Salariat are well above the national median and in nearly all countries there is a substantial difference between the High and the Low Salariat. In countries with a substantial share of Small farmers (in decreasing order Romania, Poland, Greece and Serbia), Small farmer's median earnings are well below the overall median, and they are generally the social class with the lowest median earnings. Median earnings of both Lower white collar and Routine occupations are also consistently below the overall median in all 30 countries.

A more varied pattern is observable for the remaining classes, with no clear uniform social class 'hierarchy of earnings'. The latter is not unexpected as the nine-category class schema is not indended to be hierarchical (Rose & Harrison, 2007). A somewhat more hierarchical pattern emerges with the three-class schema as presented in Fig. 3, with the Salariat consistently at the top of the earnings distribution and the Working class at the lower end, with the exception of Romania in which the intermediate class
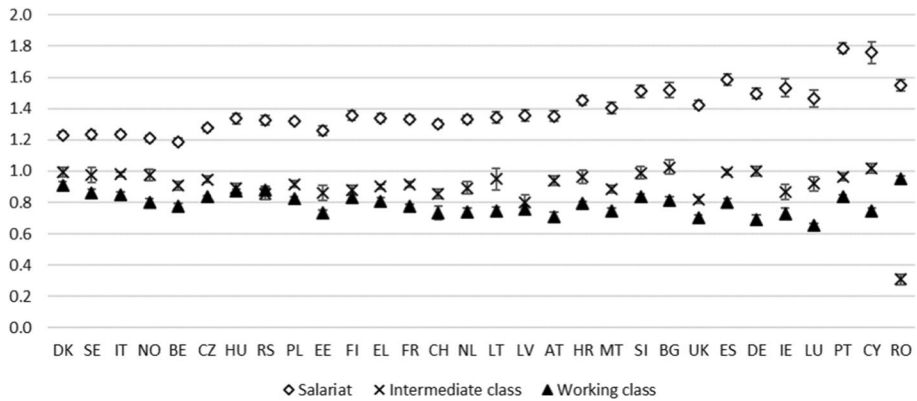
Fig. 3 Median earnings by social class, expressed as a proportion of national median earnings, people at active age and currently in paid employment with non-zero earnings in the income reference year, three-class schema EU-SILC 2018. Note: Countries sorted by the difference between the highest and lowest median earnings in the country. 95% confidence intervals. *Source*: EU-SILC 2018 (release Spring 2020), computations by the authors

has the lowest earnings. The median earnings of the intermediate class are in many countries not much above those of the working class, and very close to the median earnings in the population at work. Furthermore, the degree of between-class inequalities in median earnings varies strongly across countries. Whereas in a nine-class schema the gap between the classes with the highest and lowest median earnings is the smallest in Denmark and Norway (at 65% of national median earnings), it is largest in Romania and Cyprus (above 120% of national median earnings), although if the Small farmers would be disregarded Romania (and Serbia) would have an earnings gap similar to countries in the middle of the distribution. As is shown in the supplementary material, the earnings gap between the Salariat and other classes (in a three-class schema) is also present when looking at females and males separately, or at persons living in households with a similar composition, while yielding broadly similar country rankings for males and females. The substantially lower earnings of females stands out, even when comparing females and males within the same class. The gender gap in earnings is in many countries (though not all) largest for the working class.

These figures provide a first insight into between-class earnings inequalities and how these vary across Europe. However, because these figures do not take into account the share of each social class in the active population, they do not tell us how much class inequalities contribute to overall earnings inequality. We can assess the contribution that these between-class differentials make to overall earnings inequality in different countries by employing the mean logarithmic deviation (MLD) summary inequality measure (see methodology above). Table 2 shows the extent of between-class inequality as measured by the MLD by country, ordered on this basis. The highest levels of between-class inequality are found in Romania, Ireland, the United Kingdom, Portugal, Luxembourg and Bulgaria, while countries such as Hungary, the Czech Republic, the Nordic countries, and Belgium have much lower figures. While in about two thirds of the countries between-class inequality among females is equal to or higher than males, a similar pattern of cross-country differences can be found when looking at between-class inequality by gender (see supplementary material). In Romania, this high level of between-class inequality is to a large part

Fig. 4 Earnings inequality between social classes (nine-class schema) and total inequality, mean log deviation, EU-SILC 2018. *Source*: EU-SILC 2018 (release Spring 2020), computations by the authors
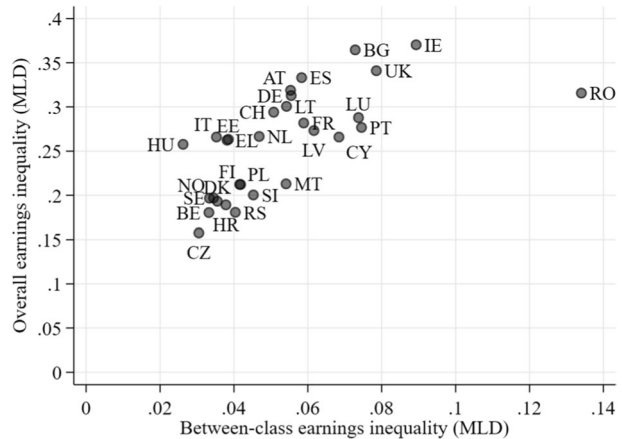
driven by the considerable size of the class of Small farmers (15% of the population in paid employment) with extremely low earnings (cf. Figure 2).

What do these findings mean for the contribution of earnings differences between these social classes to overall earnings inequality? Table 2 shows that between-class earnings differences account for a widely varying share of total earnings inequality, ranging from as low as 15% or less in Hungary, Italy, Greece and Estonia up to 25% or more in Portugal, Cyprus, Luxembourg and Malta, and up to 42% in Romania. Furthermore, the last column of Table 2 includes the equivalent figures when the three-class ESeC schema is employed. We can see that the three-class schema is capturing most of the between-class inequality that the more disaggregated nine-class schema would reveal; however, there is some variation across countries in this respect. The most striking exception is Romania, where between-class earnings inequality with a three-class schema is about half of between-class earnings inequality in the case of a nine-class schema.

How are between-class inequality and overall income inequality related to one another? Fig. 4 suggests that between-class inequality generally tends to rise with overall inequality, and the overall rank correlation between the two variables is 0.81 (and slightly lower among males). In other words, higher overall inequality is associated with higher class inequality. However, one could not reliably simply 'read off' the size of between-class gaps from the level of overall inequality. For instance, while Hungary and Cyprus, have similar levels of overall earnings inequality, the between-class inequality is much larger in Cyprus than in Hungary. Therefore, there are some important divergences in the ranking by between-class versus overall earnings inequality—with an average difference in rank between the two distributions of 4.5. These findings thus suggest that between-class earnings inequality is not always aligned well with overall earnings inequality.

4 Counterfactual Between-Class Inequality

We now proceed to examine the extent to which between-class earnings inequality is a function of observable factors, and how this varies across countries. Figure 5 compares between-class inequality as measured by the MLD by country without any adjustments with the picture after controlling for observable factors and equalising returns to those
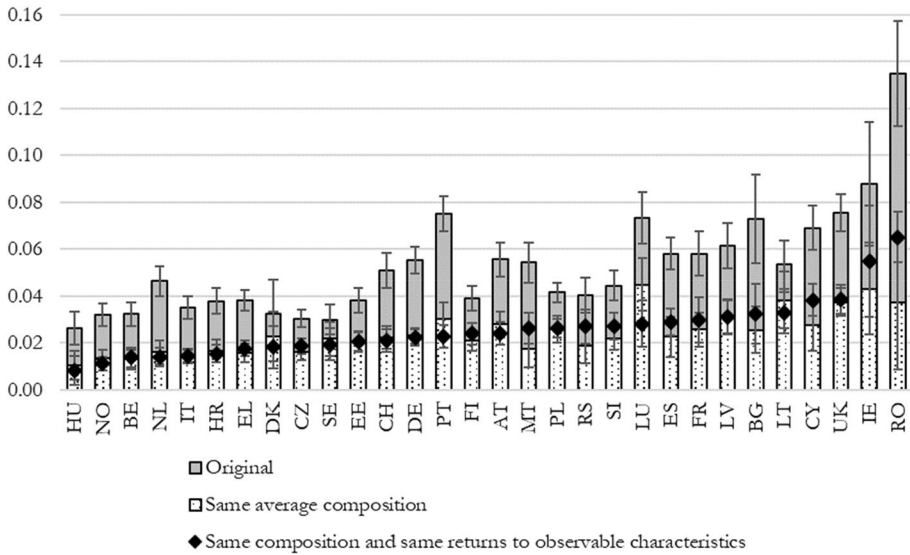
Fig. 5 Earnings inequality between social classes before and after controlling for observable characteristics, EU-SILC 2018. Note: Countries ordered from low to high between class inequality, after controlling for observable characteristics. Sample restricted to all cases without missing observations on any of the regression variables. Some classes excluded in some countries (see data and methods section). 95% confidence intervals. *Source*: EU-SILC 2018 (release Spring 2020), computations by the authors

factors. As expected, controlling for that range of factors reduces between-class inequality quite substantially in nearly all countries—in 16 out of 30 countries by at least 50%, and in all countries by at least 30%. This is not surprising as many of the factors considered, such as education, are strongly linked with class. However, the extent to which adjusting for those factors reduces between-class inequality differs across countries. The strongest absolute reductions in between-class earnings inequality can be found in Romania, Portugal, Luxembourg, Bulgaria and the United Kingdom, followed by some other countries with relatively high levels of between-class inequality. The variation (as measured by the standard deviation) between countries in between-class inequality is thus substantially lower in the counterfactual that assumes an equal distribution within countries in the observed factors and their returns. Furthermore, in two-thirds of the countries studied the reduction in between-class inequality is stronger for females than for males (see supplementary material).

As can also be observed from the graph, in all countries the between-class differences in 'returns' to the variables included in the regression model contribute fairly little to between-class earnings inequality once between-class differences in average composition are taken into account. In fact, only in Luxembourg and Portugal do between-class differences in returns contribute substantially to overall between-class differences in earnings. In contrast, in Romania, Malta, Serbia, Cyprus and Spain, as well as in Ireland and Bulgaria, between-class differences in returns contribute to lower between-class inequality in earnings: once controlled for differences in the average composition of social classes, the between-class earnings inequality counterfactual increases when also returns to observables are kept constant across social classes.

Fig. 6 Counterfactual earnings inequality between social classes controlling for observed characteristics and differences in returns versus total earnings inequality, Mean Log Deviation, EU-SILC 2018. Note: Sample restricted to all cases without missing observations on any of the regression variables. Some classes excluded in some countries (see data and methods section). *Source*: EU-SILC 2018 (release Spring 2020), computations by the authors
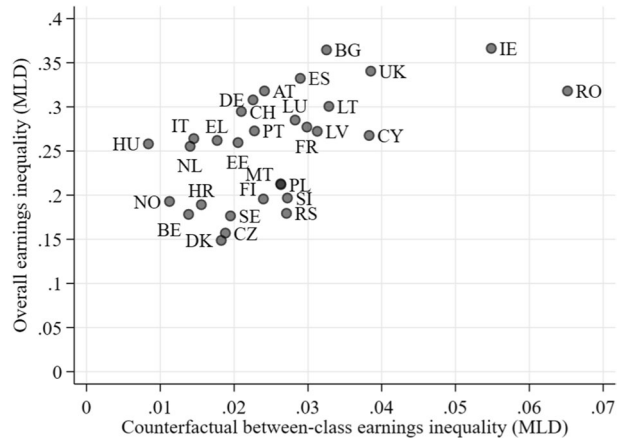
Although country-differences in between-class inequalities are substantially lower in the counterfactual scenarios, a good part of this country-variation remains 'unexplained' by the observed variables. What underlies these remaining differences across countries in between-class inequality, not attributable to differences in composition or returns to observables? One pointer towards potential influences is in their relationship with overall earnings inequality. Figure 6 illustrates that, while this relationship is not linear, countries with higher overall inequality do tend to have higher counterfactual between-class inequality (Spearman's rank correlation coefficient of 0.64 for total population, 0.63 for females and 0.52 for males). This suggests that the range of institutional factors known to underlie higher overall inequality, such as weak collective bargaining institutions and labour power, together with high levels of low pay and weak minimum wage structures, also impact on the earnings gaps between the classes not only through their effects on class composition and differences between classes in returns but also through other channels which need careful teasing out.

5 Discussion and Conclusions

In this paper, we first argued that while cross-national variations in earnings differentials between social classes have recently received attention in the sociological literature (e.g. Albertini et al., 2020; Le Grand & Tåhlin, 2013), important open questions remain about their extent and contribution to overall earnings inequality and how these vary across a wide range of country contexts, 'gross' and net of differences in class composition. Here we have investigated these questions across 30 European countries using micro-data from EU-SILC 2018 and employing decompositions of the mean log deviation measure for earnings inequality.

We found that both absolute and relative between-class earnings inequality vary widely across countries. Between-class inequality was seen to generally rise with the level of overall earnings inequality, but could not be simply assumed or predicted from it. With some variation, these patterns were also found separately among females and males. This implies in particular that for (cross-national) studies on the effects of social class on various outcomes without a good earnings measure, considerable caution is required since earnings

may often be related with the dependent variable of interest. In these cases, part of the (cross-national variation in the) social class effect is potentially an earnings effect, and at the very least runs through the disparity in earnings between classes. At the same time, our analysis has demonstrated that social class contributes to a substantial extent to overall earnings inequality. This implies, likewise, that income disparities between social classes are an important underlying mechanism that can explain associations between income inequality and various social and political outcomes found in other studies, for example with respect to health (Rözer et al., 2016) or political participation (e.g. Schäfer & Schwander, 2019; Stolle & Hooghe, 2011). The role of class differences might become even more pronounced as inequality continues to increase in many advanced democracies, although to varying degrees.

Once differences in class composition across countries were taken into account, earnings differences between classes were seen to fall in all countries but to a varying degree. Between-class differences in returns to education and other observed compositional variables at individual and household level contributed substantially to earnings inequalities between social classes in only seven out of the thirty countries studied. The fact that the remaining 'unexplained' earnings gaps are correlated with overall earnings inequality suggests that the range of institutional and structural factors known to underlie the latter, such as collective bargaining institutions and labour power, minimum wages, and occupational profiles, impact on the average gaps in earnings between the classes not only through their effects on class composition and returns but also through other channels.

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