Contents lists available at ScienceDirect

Research in Globalization

Income inequality in Europe: Reality, perceptions, and hopes

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A R T I C L E   I N F O

A B S T R A C T

Is actual income inequality accurately translated into people's perceptions, and what are the genuine hopes of citizens? Our contribution offers insights into how the reality and two subjective dimensions of income inequality, namely perceptions, and desires, interact. Using data from the Eurobarometer, we study the main patterns of different 'types' of inequality (measured by $S80/S20$ ratio) in the regions of the EU Member States. Considering the role of attitudes and beliefs, the residents of the same region are typically found to hold a similar perception of how unequal their society is. Moreover, and somewhat surprisingly, the reality is contrary to people's perception since low (high) actual income inequality in the region is often reflected in its overestimated (underestimated) perception. We also show that perceived, and desired inequality are distinct metrics as commonly applied determinants of perceptions are rather weakly associated with desired inequality, probably due to the normative nature of the latter. The evidence presented here implies that objective measures of income inequality should be used in conjunction with subjective ones to gain a complete picture of the phenomenon. Our findings may assist policy-makers and other interested stakeholders in designing dedicated policies to counteract inequality in all its forms.

1. Introduction

Rising inequalities have become a distinctive feature of the world economy over the last decades. International organizations, researchers and world leaders across the globe acknowledge the threat posed by inequality to the prosperity of nations. Generally speaking, an unequal distribution of any kind of resources, e.g. income or wealth, is associated with a decline in trust, life and/or job satisfaction, happiness, in turn leading to lower growth (Herzer & Vollmer, 2012). However, despite governments aim at tackling inequality of any kind, the problem is still persistent both in developed and developing countries.

In this work we study income inequality[1] across 190 regions in 28 countries of the EU.[2] We contribute to the current literature by looking at the phenomenon from different perspectives and building different measures to capture the nuances of it. We start by considering the "actual level" of inequality measured by income quintile share ratio ($S80/S20$), which represents the ratio of total income received by the 20% of the population with the highest income (the richest quintile) to

that of 20% of the population with the lowest income (the poorest quintile). The $S80/S20$ indicator belongs to the ratio-based family of inequality measures and, along with the widespread Gini coefficient, is commonly acknowledged by researchers and policy-makers to be the objective "metric" of how unequal a society is. In other words, the actual level of inequality aims at capturing the "real" objective inequality and it is often used to make comparisons over time and across countries. However, in our work we also consider a subjective measure of inequality and investigate if, and to what extent, it diverges from the objective one. The subjective assessment of income inequality reflects people's perceptions. A number of studies (Bussolo, Ferrer-i-Carbonell, Giolbas, & Torre, 2021; Knell & Stix, 2020; Bavetta, Li Donni, & Marino, 2019) show that disparities between objective and subjective, i.e. "perceived", inequality are due not only to individuals' errors and misperceptions of objective inequality but also to other factors that systematically affect the way in which individuals perceive inequality.

The first innovative aspect of the paper is that we include also a second subjective dimension of inequality, i.e. the "desired" level. The

desired level of inequality measures what people wish and hope for the future. Despite perceived and desired inequality being both subjective measures, they are very different in nature. In fact, while perceived inequality, albeit subjective, requires people to be neutral in their judgement and simply report what they perceive to be the reality, desired inequality implies a value-judgement.[3] Two individuals might perceive the same level of inequality, while aspiring to two completely different levels of ideal inequality. In this sense, desired inequality is a normative concept, very different from the more positive nature of perceived inequality. This makes a comparison between the two extremely interesting and, even more so, the comparison between them and the more objective inequality measure based on income distribution. To the best of our knowledge, this paper is the first that aims to discuss the relationship between objective inequality and two subjective aspects, i.e. perceived and desired inequality.

Another innovative aspect of the paper is its regional perspective. This study takes the first step towards exploring the patterns of actual, perceived and desired income inequality (all measured by $S80/S20$ ratio) across regions of the EU Member States.

In fact, surprisingly, despite the growing interest in actual regional inequality (Iammarino, Rodriguez-Pose, & Storper, 2019; Widuto, 2019), little is known about subjective dimensions of inequality, especially at regional level. This gap clearly needs to be filled as the relation between actual, perceived and desired inequality matters tremendously in our current societies for several reasons. First, over the last decades the within-country differences in terms of economic development have been growing (OECD, 2020), so that in (most) EU countries the convergence between more developed and left behind regions, as well as the ability of the latter to catch up, has been limited. Second, promoting prosperity of the Member States is high on the agenda of the EU. Although the presence of inequalities across and within the EU countries has been declared unsustainable, disparities across regions in terms of economic growth, unemployment rates and well-being are clearly requiring place-sensitive policies to reverse them (Iammarino et al., 2019). Third, recently, a relation between actual inequality and resentment has been found, in particular in the form of cyberhate, suggesting (*i*) a pronounced role of the local context in driving an undesirable behavior (Denti & Faggian, 2021), and (*ii*) the role of cultural consumption to reduce spatially heterogeneous online hate events (Denti, Crociata, & Faggian, 2021). Last, but not least, how people perceive inequality might affect their voting behavior (Xu & Garand, 2010) and preferences for social policies (Bublitz, 2022). Therefore, in the light of rising actual income inequality from one side, and entrenched regional economic disparities from the other side, this calls for a better understanding of people's perceptions and desires regarding inequality in both "core" and "peripheral" areas.

Our analysis relies on the Special Eurobarometer "Fairness, inequality and inter-generational mobility" survey for the year 2017. The survey provides information on citizens' views on inequality, namely their perceived and desired inequality.

We hypothesize that the origins of inequality perceptions germinate in the individual's immediate environment populated by a relatively homogeneous network of peers. Although we do not address the issue of the limits of immediate environment in this study, we proxy it by regions due to the data availability. It is plausible that individuals interact with others and formulate their opinion on inequality within regions, while the national distribution can be naively inferred from the perceived level of local income inequality. However, we acknowledge that the citizens might compare themselves with those living in other regions or can try to estimate the national income distribution. Nevertheless, we expect

that social and geographical proximity is going to prevail, as shown in Newman, Shah, and Lauterbach (2018).

Following previous studies (Bussolo et al., 2021; Mijs, 2021; Newman et al., 2018; Brunori, 2017), we adopt a concept of perceived inequality which is shaped by two factors: *(i)* socio-economic individual features, such as gender, age, occupation, personal beliefs and attitudes; *(ii)* socio-economic territorial features, such as the actual level of inequality, poverty, labor market insecurity.

This work contributes to the growing area of research on the determinants of perceived inequality by testing the impact of personal features and regional indicators. Therefore, the present study advances our understanding of the factors shaping subjective inequality including the role of actual inequality in the region. Moreover, this work sheds light on the regional patterns of three dimensions of inequality.

The remainder of the article is structured as follows. In Section 2, we review the literature on inequality perceptions and desires, and disparities between objective and subjective inequality. Section 3 describes the data and presents some stylized facts about the relationship between actual inequality, people's perceptions and the desired level of inequality. Section 4 discusses the empirical methodology. Section 5 presents the results, while Section 6 proceeds with the discussion. The last section concludes.

2. Literature review

Previous studies on perceived inequality analyze how perceptions are formed and explain why it is important to have a clear understanding of perceived inequality. Bussolo et al. (2021) argue that subjective perceptions of inequality play a crucial role on the demand for redistribution. The authors propose a simple model in which perceptions of inequality, together with personal views on social justice and political ideology, contribute to determine the demand for redistribution. Perceived inequality is conceptualized as *"the subjective "knowledge" of the complex phenomenon that is economic inequality"* (p. 2 Bussolo et al., 2021). Perceptions of inequality are in turn determined by the exposure to objective inequality.

Despite a growing interest in subjective dimension of inequality, its definition and measurement is an ongoing debate. In fact, due to a complexity of the phenomenon, it can be understood and conceptualized in different ways. According to Choi (2021) subjective inequality can be classified into three types: perception of reality, perception of norms, and perception of justice. The first type mirrors individual's understanding of how much inequality exists in a society (perceived inequality in our study), while the second one is his view on what a society should be (the desired level of inequality). Finally, perception of injustice is a difference between what the reality is believed to be and what it should be.

As for measurement of subjective inequality, recent studies offer several approaches. In particular, Kuhn (2011, 2015, 2019) measures perceived inequality using subjectively estimated occupational wages to obtain subjective Gini coefficient. Also Choi (2019) formulates a Gini coefficient of perceived social position, which is based on the distribution of perceived social position on a scale of 1 (bottom) to 10 (top). In a more recent article, Choi (2021) considers different dimensions of inequality perceptions that are not restricted to perceptions of actual inequalities. A second dimension is named the perception of norms and it is about how unequal a society should be; a third dimension is the perception of injustice, i.e., how fair the level of inequality is. The measures of perceived actual inequality and personal norms inequality are based on wage estimates across different occupations. The author calculates a subjective ratio of top to bottom groups of wages for the selected occupations. This measure is analogous to the income quintile share ratio used in our analysis.

Other scholars use graphical representation of the national income distribution and estimate corresponding subjective Gini indices for each type of a society (Gimpelson & Treisman, 2018; Bussolo et al., 2021).

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[3] We acknowledge a possibility that perceived inequality may also contain a value-driven component. For instance, individuals supporting more egalitarian society might perceive inequality to be higher, unlike those who favor an elitist society and might therefore perceive a lower level of inequality.

Besides conceptualizing subjective inequality, existing empirical studies have also documented several determinants of people's perceptions. In particular, Bobzien (2020), Bavetta et al. (2019) and Kuhn (2019) point out that citizens' perceptions of inequality are affected by ideology, attitudes and beliefs. For example, believing in meritocratic principles has been associated with a greater acceptance of income inequality. Mijs (2021) shows that citizens in unequal societies are less concerned than those in more egalitarian societies. This paradox is explained by the citizens' growing conviction that societal success is reflective of a meritocratic process. According to the paradox of inequality, citizens consent to inequality, therefore they do not perceive high inequality and are typically reluctant to support redistribution policies.

Moser and Schnetzer (2017) and Clark and D'Ambrosio (2015) focus on the individual's reference group as a factor affecting his attitudes towards inequality. A reference group is usually composed of people having similar socio-economic background (friends, family members, colleagues). Therefore, people are concerned not only about their own (absolute) earnings, but also about how much they earn compared to relevant others. A good summary of possible questions to define the reference group of people has been provided in the work of Van Praag (2011).

Also personal features significantly correlate with perceived inequality. The lower the socioeconomic status, the more unequal a society is perceived. Having fewer opportunities (i.e. being older or female) leads to perceive the society as more unequal. A number of studies has been carried out on the role of gender for earnings inequality (see also Atkinson, Casarico, & Voitchovsky (2018) for the gender divide in the top income groups), but there is little research directly investigating how people perceive inequalities depending on their gender.

Several studies (Bussolo, Lebrand, & Torre, 2020; Roex, Huijts, & Sieben, 2019; Brunori, 2017) include also macroeconomic factors, such as unemployment, poverty rate and objective inequality, as determinants of inequality perception. The rationale is that these factors shape the overall economic system, which, in turn, is correlated with people's perceptions.

The empirical results on the relationship, and possible discrepancies, between objective and perceived inequality are quite mixed and some ambiguity still remains on the role of actual inequality in shaping the perceived level of inequality. In fact, some studies have reported a positive link between actual inequality and its perception (OECD, 2021; Colagrossi, Karagiannis, & Raab, 2019; Kuhn, 2020; Xu & Garand, 2010). In contrast to them, others have found either a negative association (see, for instance, Brunori (2017) who studied the effect of actual inequality of opportunity on how it is perceived), or no statistically significant relation between the two dimensions (Bobzien, 2020). In addition, there are cross-country differences in discrepancy between actual and perceived inequality (Bussolo et al., 2021; Bavetta et al., 2019; Gimpelson & Treisman, 2018; Norton & Ariely, 2011). In other words, it is likely that in two countries with the same level of actual inequality people's perceptions will diverge. It is worth noting that the above mentioned studies, except Colagrossi et al. (2019) and Xu and Garand (2010), define actual inequality at country level. However, we believe that the role of actual inequality at regional level for people's perception should be more pronounced than the overall income differences at country level.

Other studies about the demand for redistribution focus on different factors shaping preferences for inequality. For example, Chapple, Förster, and Martin (2009) review a number of articles explaining inequality aversion and an ensuing desire for redistribution. Certain socio-demographic variables are correlated with less tolerance towards inequality: being older, poor, single, a woman or belonging to an ethnic minority implies a greater exposure to the risk associated with higher inequality (Alesina & Giuliano, 2010). The same occurs for people experiencing big negative events, such as divorce, death of a relative, unemployment, hospitalization (Alesina & La Ferrara, 2005), and for

people being skeptical about opportunities to climb the social ladder by working hard (Alesina, Di Tella, & MacCulloch, 2004). Finally, the authors observe that preferences for inequality could be part of national culture, which are transmitted from generation to generation.

Despite the importance of perceived inequality in affecting individual preferences for redistribution, subjective perceptions are often ignored because of economists' skepticism of subjective statements. "People do not have incentive of revealing their genuine beliefs, and they are confronted to say the socially acceptable thing." (p. 2 Bussolo et al., 2021). This perspective sees the divergence between perceived and objective inequality to individual errors and misperceptions, an approach that we find a bit reductive and that, in fact, we think calls instead for a better understanding of the topic.

3. Methodology

Our baseline model of the determinants of perceived and desired inequality includes socio-demographic covariates, respondents' beliefs and objective indicators of regional economies. We also consider regional fixed effects to account for time-invariant unobservable factors.

Assuming that individuals are denoted by i, with $i = 1, …, I$ and regions by r, with $r = 1, …, R$, our model is specified as follows:

$$Y_{ir} = \beta_0 + \beta'_1 \mathbf{X_{ir}} + \beta'_2 \mathbf{Z_{ir}} + \epsilon_{ir}, \tag{1}$$

where Y_{ir} is the outcome variable of individual i in region r, i.e. perceived inequality or desired inequality; $\mathbf{X_{ir}}$ is a column vector of personal features; $\mathbf{Z_{ir}}$ is a column vector of characteristics of region r where the individual i is located; ϵ_{ir} is the usual error term.

The fact that respondents are localized in different European regions leads us to adopt a hierarchical model in which people's responses depend not only on their individual characteristics, but also on their location.

Hierarchical modelling is conveniently carried out by resorting to mixed-effect models, i.e., statistical regression models that incorporate both fixed effects (which are constant across groups) and random effects (which randomly vary across groups). By associating common random effects with observations in the same group, mixed-effect models flexibly represent the covariance structure induced by the grouping of data.

These kinds of models allow one to dissect group- and individual-level effects on individual-level outcomes, i.e., perceived or desired inequalities, accounting for non-independence of observations within groups, i.e. the regions. A common problem with observations nested within a higher level is that there may be a problem of dependencies because individual properties in the same district are likely to be similar in ways not fully accounted for by the property and district variables included in a single-level model (Jones & Bullen, 1993). If this dependency is not considered, the standard error estimates turn out to be biased (Snijders & Bosker, 1999).

We assume that individuals are denoted by i, with $i = 1, …, I$ and regions are denoted by r, with $r = 1, …, R$. We consider a random intercept model specified as follows:

$$Y_{ir} = \beta_0 + \beta'_1 \mathbf{X_{ir}} + \beta'_2 \mathbf{Z_{ir}} + A_r + \epsilon_{ir}, \tag{2}$$

where A_r is the random intercept representing level 2 (region-specific) residuals; ε_{ir} are level 1 (individual-specific) residuals. They are assumed to be mutually independent and normally distributed with zero mean and variance equal to σ^2. Level 2 residuals are assumed to be uncorrelated with ε_{ir}, mutually independent and normally distributed with zero mean and variance equal to τ^2. Level 1 residuals represent the unexplained variability of the outcome variable after considering measurable characteristics of the individual and region. Level 2 residuals represent unexplained heterogeneity at the regional level. The latter allows one to deal with the problem of spatial sorting of unobservables (Borgoni, Michelangeli, & Pontarollo, 2018). This occurs when individuals with a

Table 1
Descriptive statistics.

Variable	N	Mean	SD	Min	Max
Perceived inequality					
$S80/S20$ ratio	6,330	3.26	1.40	1	6
$S80$ (40% DK)	6,330	4.33	1.15	2	6
$S20$ (40% DK)	6,330	1.46	0.41	1	2
Desired inequality					
$S80/S20$ ratio	7,149	2.01	0.99	1	6
$S80$ (35% DK)	7,149	3.23	1.04	2	6
$S20$ (35% DK)	7,149	1.74	0.36	1	2
Individual variables					
Fairness (2% DK)	7,149	3.47	0.98	1	5
Wealthy family (1% DK)					
Imp.	7,149	0.31	0.46	0	1
Avg.	7,149	0.31	0.46	0	1
Not imp.	7,149	0.38	0.49	0	1
Right people (1% DK)					
Imp.	7,149	0.62	0.49	0	1
Avg.	7,149	0.30	0.46	0	1
Not imp.	7,149	0.08	0.28	0	1
Hard work (1% DK)					
Imp.	7,149	0.66	0.47	0	1
Avg.	7,149	0.26	0.44	0	1
Not imp.	7,149	0.09	0.28	0	1
Good education (0.4% DK)					
Imp.	7,149	0.71	0.46	0	1
Avg.	7,149	0.22	0.41	0	1
Not imp.	7,149	0.08	0.27	0	1
Political interest	7,149	2.47	0.99	1	4
Voting behavior (16% DK)					
Left	7,149	0.26	0.44	0	1
Center	7,149	0.46	0.50	0	1
Right	7,149	0.20	0.40	0	1
Income differences (1.7% DK)	7,149	4.05	0.95	1	5
Social ladder (3% DK)					
Top	7,149	0.30	0.46	0	1
Middle	7,149	0.61	0.49	0	1
Bottom	7,149	0.08	0.28	0	1
Neighborhood (2% DK)					
Poor	7,149	0.11	0.31	0	1
Rich	7,149	0.19	0.39	0	1
Gender (male = 1)	7,149	0.51	0.50	0	1
Generation 1	7,149	0.26	0.44	0	1
Generation 2	7,149	0.32	0.47	0	1
Generation 3	7,149	0.42	0.49	0	1
No or primary	7,149	0.13	0.34	0	1
Secondary	7,149	0.39	0.49	0	1
Post-secondary	7,149	0.31	0.46	0	1
Master	7,149	0.16	0.36	0	1
Employee	7,149	0.56	0.50	0	1
Self-employed	7,149	0.09	0.29	0	1
Not working	7,149	0.27	0.44	0	1
Unemployed	7,149	0.08	0.27	0	1
Regional variables					
GDP p.c.	7,149	25292.51	11318.96	7,500	72,500
Poverty	7,149	16.65	5.45	4	41
Unemployment	7,149	10.77	5.48	3	36
Actual inequality	7,149	4.70	1.27	2	9

DK indicates "do not know" responses for the Eurobarometer variables, in percent of the total sample. Post-stratification weights are applied for survey variables.

particular level of perceived or desired inequality are located in the same regions and the factor determining the level of the outcome variable is unobservable. The overall conditional variability of the dependent variable is $Var(Y_{ir}|\mathbf{X}, \mathbf{Z}) = \sigma^2 + \tau^2$. It can be decomposed into two components due to individual and region heterogeneity: $\sigma^2/(\sigma^2 + \tau^2)$ and $\tau^2/(\sigma^2 + \tau^2)$, respectively. The latter is known as the intraclass correlation coefficient (ICC), representing the proportion of variability due to region clustering and measuring the correlation shared by units within a region (Goldstein, 2011; Snijders & Bosker, 1999).

4. Data and variables

This study relies on the Special Eurobarometer No. 88.4 on "Fairness, inequality and intergenerational mobility", a survey conducted in 28 EU Member States in 2017. Each Eurobarometer survey uses a new independent sample, while the sampling design is common for all the Member States of the European Union.

For this Special Eurobarometer the respondents were drawn using a multi-stage random probability sampling design. The primary sampling units were selected from administrative regions in each country according to the Nomenclature of Territorial Units for Statistics (NUTS), in the second stage households were drawn randomly, followed by a randomly drawn respondent from each household in the third stage. For each country the number of interviews roughly equals to 1,000,[4] and the total number of observations is 28,031. Importantly for our analysis, the survey provides information on perceived and desired inequality. We note that the question module on subjective inequality was newly introduced and has not been replicated at the time of writing.

In this study we focus on working age population (15–65), which reduces the sample by 7,325 observations (to 20,706 cases). As the questions on subjective inequality are of primary interest for this study, we restrict the sample to the respondents who answered the questions on perceived inequality (16,625 observations) and the desired level of inequality (17,190 observations).

The data from this survey have been merged with the data on objective (actual) inequality and other regional[5] context indicators from Eurostat, the Organisation for Economic Cooperation and Development (OECD), and national statistics offices, for instance the Office for National Statistics (ONS) for the United Kingdom. Although the Eurobarometer survey is nationally representative (Nissen, 2014), an issue that arises in our analysis is its regional representativeness. A possible approach to address such non-representativeness at regional level is to pool several waves of the survey to increase the number of observations in each spatial unit as shown by Van de Walle and Migchelbrink (2022). However, this approach cannot be adopted in our analysis because the wave addressing subjective inequality is a unique one and has not been replicated as mentioned above. Another method could be to investigate the non-response rate in each country and whether it correlates with principal socio-demographic variables. However, this information is not disclosed by the Foundation maintaining the Eurobarometer survey, hindering therefore further investigation.

Actual inequality ratio refers to 2013 in most cases, which is the most recent year for which data are available. The time gap between objective and subjective inequality allows us to mitigate a possible endogeneity problem between perceived or desired inequality and the objective measure, in the form of reverse causality.

Descriptive statistics of variables, grouped in three categories, namely *(i)* subjective inequality *(ii)* individual variables, and *(iii)* regional variables, is shown in Table 1 (see Table A1 in Appendix for variables' definitions).

(i) Subjective inequality. A widespread class of inequality measures is based on a ratio between the "rich" and the "poor" percentiles or deciles of the population, while the income quintile share ratio, also known as $S80/S20$ ratio, belongs to this class. It represents the ratio of total income of the richest 20% of the population (top quintile) to the total income of the poorest 20% of the population (bottom quintile). The

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[4] The exceptions are the United Kingdom and Germany with separate samples for Great Britain (1000) and Northern Ireland (300), and the Eastern (500) and the Western (1000) parts of Germany. In addition, for Luxembourg, Cyprus, and Malta each sample has 500 observations.

[5] For most countries the data are available for NUTS 2 level of regions. However, for Germany and the United Kingdom, NUTS 1 level is used for regional variables since the data on subjective inequality are available at this level. A detailed description of our sample is provided in Appendix.

strength of this measure is its computational simplicity and intuitive interpretation. By construction, $S80/S20$ ratio responds to the changes at the top and the bottom of income distribution. However, it might be very sensitive to outliers at both extremes, while incomes from the middle of the distribution and their changes do not directly affect the ratio. It should be noted that inequality measures are typically subject to such sensitivity trade-offs.

In this paper, the three types of inequality are measured by $S80/S20$ ratio. The question to elicit people's perceived level of inequality is formulated as follows: "We would like to ask you a few questions about how you think net income is distributed in [your country]. Think of the total income, after tax, earned by all individuals in [your country] as a pie. Roughly how many slices of this pie do you think is *currently earned* by: the 20% of people who earn the most; the 20% of people who earn the least".

The follow-up question asks about people's desired inequality, in particular how many slices of this pie *should* ideally go to the top and bottom quintiles. The respondents see the image of the pie, which is divided into 10 slices and can choose among such response categories: from 0 ("none of the pie"), 1, 2 ("a proportional share of the pie") to 10 ("all of the pie"). Moreover, both questions include "do not know" (DK) type of response.[6]

We should note here that the above mentioned questions do not directly ask about inequality nor use this term explicitly. In fact, the respondents answer how much according to them the top ($S80$) and the bottom ($S20$) quintiles earn or should earn, and they most probably are not aware of such metric of income inequality as $S80/S20$ ratio. However, we believe that people's understanding of the difference between income shares of the top and bottom earners reflects their perceptions of how unequal the distribution is. Moreover, what the respondents believe this difference ought to be should proxy their desired level of inequality. Therefore, using respondents' answers we are able to construct perceived and desired $S80/S20$ ratios, which can be benchmarked against actual inequality.

A few comments on the possible values of subjective $S80/S20$ ratio are in places here. Given the subjective nature of income shares of the top and the bottom quintiles, some values of the obtained perceived and desired inequality ratios appear to be inconsistent. Therefore, we introduce the following consistency conditions. First, it is required that $S20$ does not exceed 20% of the pie (i.e. $1 \leqslant S20 \leqslant 2$). Second, $S80$ must be greater than 20% of the pie and less than $1 - 4 \times S20$ (i.e. $2 \leqslant S80 \leqslant 6$). Therefore, the consistent subjective ratio is $1 \leqslant S80/S20 \leqslant 6$, where lower bound implies a perception of equal income shares of the richest and the poorest quintiles, while the intuition of the upper bound is a perception that the income share of the top earners is six times as large as the one of the bottom earners. Focusing on the consistent values of the ratio we have 3,657 observations for perceived inequality and 4,336 observations for desired inequality. The DK type of responses are approximately equal to 2,700 for perceived and desired $S80$ and $S20$ shares.

(ii) Individual variables. The list of individual-level variables presents the determinants of subjective inequality at micro level including people's (un)fairness feelings, meritocratic vs. non-meritocratic beliefs etc.

The variable *Fairness* measures to what extent the individual considers his current life outcomes fair. The corresponding question asks to rate from 1 = strongly disagree to 5 = strongly agree the following statement: "I believe that most of the things that happen in my life are fair".

Whether people believe in merit-based factors of success is related to the following statement: "How important do you think each of the following are for getting ahead in life":

- coming from a wealthy family
- knowing the right people
- having a good education
- working hard

The response options are given on a five-point Likert scale and range from 1 = not important at all to 5 = essential. For each question we create three dummy variables for the perceived role of each factor: important (if values 4 or 5), average (value 3 on the scale), and not important (if values 1 or 2). Wealthy family and knowing the right people are the factors that go beyond individual's control or do not result from hard-working attitudes, i.e. non-meritocratic factors of success. By contrast, hard work and good education are meritocratic factors since they reflect individual's efforts to achieve their desired outcomes. Although education is somewhat affected by circumstances beyond person's control, i.e. offspring's educational attainment is often affected by the parental background, we consider it a meritocratic factor.

The variable *Political interest* summarizes individual's interest in local, national, and European political matters and ranges from 1 = no interest to 4 = strong interest. Political matters might include also inequality-related problems making the person (potentially) better informed about the problem and affecting his perceptions of inequality. Another aspect we account for is respondent's voting behavior. We create three dummy variables according to individual's placement on the ten-step political views scale: *Left* equal to 1 if individual chooses the steps from 1 to 4 on the scale and 0 otherwise; *Center* for placement on 5th or 6th steps and 0 otherwise; *Right* if placed on the steps from 7 to 10 and 0 otherwise.

The *Income differences* variable is relevant because it might be connected to individual's tolerance for existing inequalities. It builds on the following statement: "Nowadays in [your country] differences in people's incomes are too great", with a five-point Likert scale types of responses, with 1 = strongly disagree and 5 = strongly agree.

Dummy variables *Top* (taking the values 1 if steps 7–10 and 0 otherwise), *Middle* (taking the values 1 if steps 4–6 and 0 otherwise), and *Bottom* (equal to 1 if steps 1–3 and 0 otherwise) measure the subjective position on a ten-step "social status" ladder. The reported social class is suggested to be a more stable proxy of an individual's socio-economic status than income since earnings may change more frequently than one's education, occupation or the network of peers (Verme et al., 2014). However, we acknowledge the possible existence of the so called "bunching in the middle" problem, i.e. when individuals place themselves into the middle of a ten-step ladder more often (see Bussolo et al. (2020) for the discussion of subjective position on a social status ladder and its determinants). As shown in Table 1, around 60% of the respondents believe to be in the middle of the ladder. It is in line with the "center bias" (Hvidberg, Kreiner, & Stantcheva, 2022) or the "middle-class bias" (Fehr, Mollerstrom, & Perez-Truglia, 2022) when relatively richer (poorer) individuals tend to underestimate (overestimate) their own position (Knell & Stix, 2020; Cruces, Perez-Truglia, & Tetaz, 2013).

We also aim to control for individual's perception of local income and create two dummies for the question on neighbourhood: *Poor neighborhood* for very poor/fairly poor response modalities and 0 otherwise; and *Rich neighborhood* for very rich/fairly rich and 0 otherwise. The fact that people are surrounded by rich or poor (or both) in the locality is reported to affect their perception of inequality (Minkoff & Lyons, 2019).

The list of personal features ends with the standard socio-demographic controls such as gender, birth cohort, education and employment status.

Besides questions on subjective inequality, DK type of response is also included in the following questions from the Eurobarometer survey: fairness (2%), wealthy family (1%), right people (1%), good education (0.4%), working hard (1%), voting behavior (16%), social status ladder (3%), neighborhood (2%) and respondent's education (0.4%). In order

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[6] We explain later in this section how these responses are treated for subjective inequality and some other individual variables.

Table 2
Socio-demographic variables in the full sample and the restricted samples.

	Whole sample (N = 16,596)		Perceived inequality (N = 6,330)		Desired inequality (N = 7,149)	
	Mean	SD	Mean	SD	Mean	SD
Gender (male = 1)	0.51	0.50	0.49	0.50	0.51	0.50
Age	40.83	14.11	40.18	14.60	40.62	14.39
No or primary	0.12	0.32	0.15	0.36	0.13	0.34
Secondary	0.43	0.49	0.40	0.49	0.39	0.49
Post-secondary	0.31	0.46	0.31	0.46	0.31	0.46
Master	0.14	0.34	0.13	0.34	0.16	0.36

The whole sample includes all the observations when the questions on perceived and desired inequality were answered; the restricted sample includes consistent values of the top and the bottom quintiles with the following condition satisfied: $1 \leqslant S80/S20 \leqslant 6$. Post-stratification weights are applied.

not to loose the observations we introduce dummy variables when the respondent chooses this modality. In this way we aim to control for unobservable factors correlating both with perceived/desired inequality and the choice of DK response option. Moreover, for the regression analysis, we substitute DK responses with the corresponding mean at regional level.

Table 2 shows the descriptive statistics for age, gender and education in the whole sample, i.e. including inconsistent values of perceived and desired inequality indices, and the restricted sample, i.e. with consistent values of $S80, S20$ and the obtained ratio.

As can be seen from the table, the restricted sample reflects key features of the full sample in terms of gender, age and education of the respondents, suggesting that restricted sample is still representative of the target population.

(iii) Regional variables. Besides the actual level of inequality, measured by the $S80/S20$ ratio, we include the GDP per capita in the list of regional features to control for region's actual prosperity. Moreover, we add the unemployment rate and the poverty rate at the corresponding NUTS level.

By substituting DK response modalities with regional mean of corresponding variable we get N = 6,330 for perceived inequality and N = 7,149 for desired inequality across 190 regions. The number of observations per region ranges between 1 and 291 cases, while the average number of cases is 33. We do not exclude the regions with a few individual observations from the analysis.[7]

5. Results

5.1. Actual, perceived and desired inequality: some descriptive statistics

Before presenting the results of our econometric model, we start by showing some patterns of three types of inequality, i.e. actual, perceived and desired inequality, across and within 28 EU Member States.

Fig. 1 shows actual, perceived and desired $S80/S20$ ratio by country. Several interesting patterns occur here. First, citizens of the majority of countries underestimate the actual level of income inequality, especially in Poland, Bulgaria, Romania, Italy etc. Second, in several countries, aggregated people's perceptions are more accurate and tend to converge on actual inequality at country level, as for instance in Germany, Austria and Belgium. Finally, an overestimation of actual inequality is observed in Sweden, Finland, the Netherlands, the Czech Republic and Slovenia. A similar country-level discrepancy between actual and perceived income (or wealth) inequality or between actual and perceived individuals'/ households' ranks in the national income distribution has been reported in previous studies, for instance by Bublitz (2022), Bussolo et al. (2021), Gimpelson and Treisman (2018), Hauser and Norton (2017), Cruces et al. (2013), Norton and Ariely (2011). However, a potential channel that might (to some extent) explain the discrepancy between actual and perceived inequality can be related to slightly different definitions of these concepts. In fact, perceived (and desired) inequality is defined in the survey as after-tax interpersonal income inequality making the respondents think in terms of individuals. However, actual inequality is defined by Eurostat and the OECD among the households using the equivalised disposable income. Consequently, the discrepancy between actual and perceived $S80/S20$ ratios could be partially driven by these slightly different definitions of inequality.

From the other side, desired inequality is lower than perceived inequality (the only exception is Bulgaria where people's perceptions and desires coincide) and has similar values in almost all countries of the EU: its mean value is 2.11 as shown in Table 1, which indicates that people wish the incomes of the richest quintile to be ideally twice as much as of the bottom quintile. This result can be interpreted from two possible perspectives. Firstly, low aggregated values of desired $S80/S20$ ratio could be due to an anchoring effect. The questions to elicit people's desired inequality are based on ratios and the respondents, keeping in mind 20% of the richest and poorest citizens, might only slightly adjust the desired income shares of top and bottom quintile (see Eriksson & Simpson (2012) for the discussion of the percent and the average approaches to measure subjective inequality). Secondly, besides the
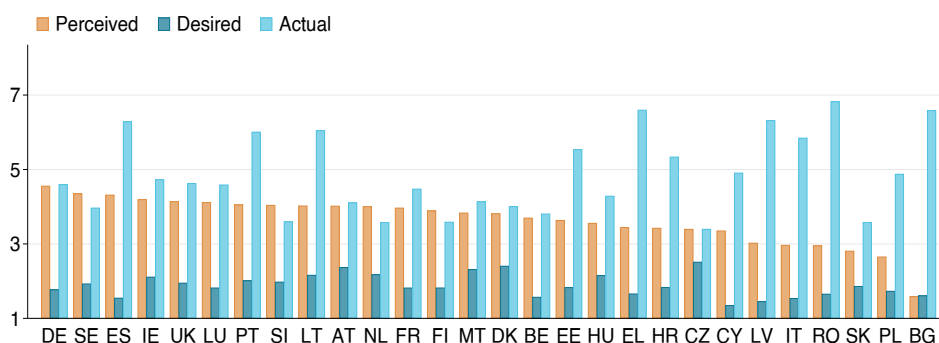
Fig. 1. Perceived, desired and actual income inequality ($S80/S20$ ratio), by country. *Note:* post-stratification weights are applied. *Source:* authors' calculations based on the data from the Eurobarometer, the OECD and Eurostat.

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[7] As shown by Clarke (2008) a multilevel model provides valid and reliable estimates for an average of five observations per group. We have run our models excluding the regions with less than five individual observations and this exclusion did not change our results.

Table 3

Spearman correlation for subjective inequality and regional context variables

	Perceived	Actual	GDP	Poverty	Unemployment
Perceived $S80/S20$	1				
Actual $S80/S20$	−0.300 (<0.001)	1			
GDP	0.530 (<0.001)	−0.282 (<0.001)	1		
Poverty	−0.149 (<0.001)	0.509 (<0.001)	−0.488 (<0.001)	1	
Unemployment	−0.207 (<0.001)	0.357 (<0.001)	−0.540 (<0.001)	0.462 (<0.001)	1
	Desired	**Actual**	**GDP**	**Poverty**	**Unemployment**
Desired $S80/S20$	1				
Actual $S80/S20$	−0.332 (<0.001)	1			
GDP	0.157 (<0.001)	−0.274 (<0.001)	1		
Poverty	−0.175 (<0.001)	0.498 (<0.001)	−0.492 (<0.001)	1	
Unemployment	−0.308 (<0.001)	0.376 (<0.001)	−0.545 (<0.001)	0.478 (<0.001)	1

p values in parentheses. Subjective inequality data are aggregated at regional level. For Belgium, Greece and Poland actual inequality data are available at NUTS 1 level; for Germany and the UK actual, perceived and desired inequality are at NUTS 1 level. *Source:* authors' calculations based on the data from the Eurobarometer, the OECD, Eurostat, Statistics Portugal and ONS (UK).
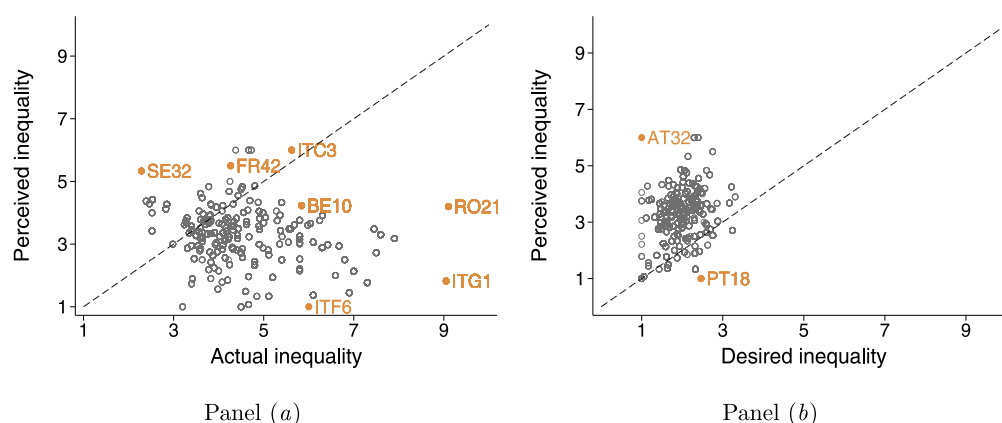
Panel (*a*)

Panel (*b*)

Fig. 2. Actual and perceived inequality (panel *a*), desired and perceived inequality (panel *b*), by regions. *Note:* perceived $S80/S20$ ratio is obtained for the year 2017, actual inequality refers to the year 2013, except France (2010), the UK (2011) and Portugal (2015). For Belgium, Greece and Poland actual inequality data are available at NUTS 1 level of regions, while for Germany and the UK both actual and subjective inequality are at NUTS 1 level. *Source:* authors' calculations based on the Eurobarometer, the OECD, Eurostat, and Statistics Portugal data.

possible anchoring effect, this result should also indicate a strong preference of the EU citizens for egalitarian income distribution, despite the fact that they often underestimate the status quo.

It is also important to study the association between subjective inequality and regional context variables (Table 3). What stands out from the table is a negative association between actual and perceived inequality at regional level. This implies that residents of regions with objectively higher inequality tend to underestimate the true inequality and vice versa (for maps of perceived, desired and actual inequality in the EU regions see Figs. A1, A2 and A3 in Appendix). It is plausible that people can underestimate actual inequality due to their belief in meritocratic factors behind unequal distribution, which leads to a greater acceptance of income inequality as shown by Mijs (2021). Moreover, there is a negative correlation between actual and desired inequality across regions, which should also indicate a preference for less income differences.

As for the regional context, more unequal places are also poorer and have worse labor market conditions – as shown by a positive pairwise rank correlation between actual inequality, poverty and unemployment – suggesting that such regions tend to accumulate several weaknesses. Therefore, it becomes even more relevant to study how people perceive inequality, what they wish it to be, and what determines their perceptions and desires.

Fig. 2 illustrates the relation between people's perceptions and actual inequality (*a*), and their perceptions and desired inequality (*b*).

from regional perspective. The 45-degree line shows the case when actual inequality is accurately perceived by people or when their perceptions and desires are equal. Apparently, and somewhat surprisingly, the majority of regions are below this benchmark line suggesting a negative association between the "reality" of inequality and its perception. Interestingly, the respondents from the regions in the South and East of the EU mostly underestimate actual inequality (perceived $S80/S20$ < actual $S80/S20$), while those living in some regions in the North and West tend to overestimate it (perceived $S80/S20$ > actual $S80/S20$, Fig. 2*a*). Such distorted inequality perceptions might lead to distorted policy preferences, for instance the citizens of peripheral areas, perceiving inequality as being lower than what it is, might be reluctant to support redistribution policies despite rising inequality (Franko, 2017). From the other side, a perception of inequality to be high in core territories should lead to a higher demand on redistribution there.[8]

Another important feature is that the discrepancy between actual

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[8] However, this causality should be interpreted with caution. It is possible that perceived inequality and aversion to inequality are closely related concepts. In this case, the countries whose population is highly inequality averse, might implement more generous redistributive policy, while the citizens may still perceive inequality to be high.

Table 4

Estimation results of a baseline model.

	Perceived $S80/S20$			Desired $S80/S20$		
	(1)	(2)	(3)	(4)	(5)	(6)
Fairness	0.001			0.022		
	(0.016)			(0.012)		
Wealthy family (imp.)		−0.069	−0.069		−0.005	−0.005
		(0.042)	(0.042)		(0.030)	(0.030)
Wealthy family (not imp.)		−0.097*	−0.097*		−0.049	−0.049
		(0.041)	(0.041)		(0.029)	(0.029)
Right people (imp.)		−0.005	−0.005		−0.008	−0.008
		(0.039)	(0.039)		(0.028)	(0.028)
Right people (not imp.)		−0.012	−0.012		0.059	0.059
		(0.065)	(0.065)		(0.048)	(0.048)
Hard work (imp.)		−0.077*	−0.077*		0.037	0.037
		(0.039)	(0.039)		(0.027)	(0.027)
Hard work (not imp.)		−0.097	−0.097		−0.069	−0.069
		(0.064)	(0.064)		(0.045)	(0.045)
Education (imp.)		0.040	0.040		0.003	0.003
		(0.041)	(0.041)		(0.030)	(0.030)
Education (not imp.)		0.013	0.013		−0.039	−0.039
		(0.068)	(0.068)		(0.049)	(0.049)
Political interest	0.014	0.007	0.007	−0.020	−0.022	−0.022
	(0.017)	(0.017)	(0.017)	(0.012)	(0.012)	(0.012)
Left		0.145***	0.145***		−0.047	−0.047
		(0.043)	(0.043)		(0.030)	(0.030)
Center (Ref.)						
Right		0.007	0.007		0.093**	0.093**
		(0.045)	(0.045)		(0.034)	(0.034)
Income differences	0.032	0.024	0.024	−0.070***	−0.061***	−0.061***
	(0.019)	(0.019)	(0.019)	(0.014)	(0.014)	(0.014)
Top		−0.023	−0.023		0.094*	0.094*
		(0.062)	(0.062)		(0.043)	(0.043)
Middle		0.014	0.014		−0.009	−0.009
		(0.052)	(0.052)		(0.036)	(0.036)
Bottom (Ref.)						
Rich area	0.075	0.080	0.080	0.120***	0.104**	0.104**
	(0.050)	(0.050)	(0.050)	(0.035)	(0.035)	(0.035)
Poor area	0.021	0.015	0.015	0.011	0.016	0.016
	(0.050)	(0.051)	(0.051)	(0.034)	(0.034)	(0.034)
Gender (male = 1)	0.107***	0.109***	0.109***	0.065**	0.061**	0.061**
	(0.032)	(0.032)	(0.032)	(0.023)	(0.023)	(0.023)
Generation 1 (Ref.)						
Generation 2	−0.011	−0.007	−0.007	−0.039	−0.042	−0.042
	(0.040)	(0.040)	(0.040)	(0.029)	(0.029)	(0.029)
Generation 3	−0.012	−0.007	−0.007	−0.057*	−0.057*	−0.057*
	(0.040)	(0.039)	(0.039)	(0.029)	(0.028)	(0.028)
No or primary (Ref.)						
Secondary	0.082	0.077	0.077	−0.045	−0.043	−0.043
	(0.043)	(0.043)	(0.043)	(0.032)	(0.033)	(0.033)
Post-secondary	0.136**	0.131*	0.131*	0.033	0.026	0.026
	(0.051)	(0.052)	(0.052)	(0.038)	(0.038)	(0.038)
Master	0.342***	0.333***	0.333***	0.069	0.049	0.049
	(0.064)	(0.064)	(0.064)	(0.044)	(0.045)	(0.045)
Actual inequality			−0.232*			−0.205*
			(0.100)			(0.102)
GDP p.c.			0.009			−0.026***
			(0.008)			(0.004)
Poverty			0.020			0.077***
			(0.012)			(0.019)
Unemployment			−0.082***			−0.002
			(0.012)			(0.010)
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes
N	6,330	6,330	6,330	7,149	7,149	7,149
R^2	0.294	0.297	0.297	0.172	0.177	0.177
Adjusted R^2	0.269	0.271	0.271	0.147	0.151	0.151

Standard errors in parentheses. $***p < .001$, $**p < .01$, $*p < .05$. Other regressors include self-employed, employee, unemployed, DK dummies.

and perceived inequality can be found not only across countries, but also within them. The case of Italy is a prominent example of such variability because its Southern regions are, in fact, highly unequal. Nevertheless, the respondents in the South do not perceive inequality to be that high, e.g. in Sicily ("ITG1"), which differs from the regions in the North of Italy, e.g. Liguria ("ITC3"), where actual inequality is perceived almost

accurately. Another interesting comparison is among regions with a comparable level of actual inequality but located in different countries. Take, for instance, Calabria ("ITF6") in Italy and Brussels ("BE10") in Belgium. Although these regions have similar values of actual $S80/S20$ ratio, Italian respondents perceive inequality to be lower than Belgian ones (in both regions perceived $S80/S20$ ratio is below the actual level of

Table 5

Estimation results of a multilevel model.

	Whole sample						Region groups			
	Perceived $S80/S20$			Desired $S80/S20$			Perceived $S80/S20$		Desired $S80/S20$	
							Q1	Q5	Q1	Q5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fairness	0.005			0.025						
	(0.018)			(0.013)						
Wealthy family (imp.)		−0.079	−0.078		−0.003	−0.004	−0.044	−0.197	−0.090	−0.146
		(0.045)	(0.045)		(0.033)	(0.033)	(0.101)	(0.163)	(0.054)	(0.079)
Wealthy family (not imp.)		−0.093*	−0.097*		−0.053	−0.052	0.045	−0.410**	−0.073	−0.136
		(0.039)	(0.039)		(0.038)	(0.038)	(0.129)	(0.150)	(0.040)	(0.088)
Hard work (imp.)		−0.078	−0.080		0.030	0.030	−0.132	−0.069	0.017	0.033
		(0.044)	(0.043)		(0.031)	(0.031)	(0.114)	(0.160)	(0.036)	(0.076)
Hard work (not imp.)		−0.108	−0.106		−0.065	−0.066	0.167	−0.098	−0.082	0.072
		(0.070)	(0.070)		(0.053)	(0.053)	(0.138)	(0.209)	(0.053)	(0.222)
Left		0.145**	0.142**		−0.055	−0.054	0.086	0.074	0.031	−0.100
		(0.048)	(0.048)		(0.032)	(0.032)	(0.100)	(0.127)	(0.051)	(0.067)
Center (Ref.)										
Right		0.002	0.007		0.097**	0.095*	−0.051	−0.115	−0.002	0.041
		(0.043)	(0.043)		(0.037)	(0.037)	(0.114)	(0.131)	(0.050)	(0.082)
Income differences	0.031	0.023	0.024	−0.069***	−0.058***	−0.058***	0.156*	0.173*	−0.035	−0.085*
	(0.021)	(0.020)	(0.020)	(0.018)	(0.017)	(0.017)	(0.070)	(0.070)	(0.028)	(0.042)
Top		−0.042	−0.049		0.083	0.083	−0.489*	−0.258	0.118*	−0.117
		(0.067)	(0.067)		(0.044)	(0.044)	(0.246)	(0.201)	(0.055)	(0.267)
Middle		−0.001	−0.004		−0.018	−0.018	−0.398	−0.160	0.105**	−0.148
		(0.060)	(0.060)		(0.036)	(0.036)	(0.204)	(0.155)	(0.039)	(0.190)
Bottom (Ref.)										
Gender (male = 1)	0.107***	0.110***	0.109***	0.065*	0.061*	0.061*	0.072	0.291***	−0.018	0.118
	(0.027)	(0.028)	(0.028)	(0.027)	(0.027)	(0.027)	(0.077)	(0.086)	(0.022)	(0.089)
Rich area	0.079	0.083	0.077	0.118***	0.100**	0.099**	0.247	0.464***	0.012	0.287***
	(0.056)	(0.058)	(0.058)	(0.035)	(0.034)	(0.034)	(0.163)	(0.121)	(0.046)	(0.082)
No or primary (Ref.)										
Secondary	0.084*	0.081	0.081	−0.042	−0.039	−0.042	−0.142	0.292	−0.037	−0.077
	(0.042)	(0.043)	(0.043)	(0.035)	(0.035)	(0.035)	(0.170)	(0.155)	(0.072)	(0.096)
Post-secondary	0.157**	0.153**	0.147**	0.035	0.028	0.026	−0.098	0.451**	0.015	0.076
	(0.053)	(0.055)	(0.055)	(0.042)	(0.042)	(0.042)	(0.172)	(0.164)	(0.086)	(0.121)
Master	0.350***	0.344***	0.341***	0.072	0.054	0.051	0.080	1.084***	0.036	0.187
	(0.065)	(0.066)	(0.066)	(0.043)	(0.044)	(0.044)	(0.216)	(0.232)	(0.092)	(0.113)
Actual inequality		−0.117*	−0.135*		−0.085***	−0.060*	0.016	−0.256*	−0.024	0.154*
		(0.052)	(0.068)		(0.025)	(0.030)	(0.080)	(0.112)	(0.023)	(0.069)
GDP p.c.			0.028***			−0.004				
			(0.008)			(0.003)				
Poverty			0.017			−0.002				
			(0.013)			(0.006)				
Unemployment			0.006			−0.011				
			(0.011)			(0.006)				
Variance (level 2)	0.655**	0.627**	0.558***	0.156***	0.146***	0.142***	0.551*	0.904	0.035***	0.126***
	(0.100)	(0.099)	(0.096)	(0.024)	(0.023)	(0.023)	(0.128)	(0.226)	(0.016)	(0.066)
Variance (level 1)	1.417***	1.410***	1.411***	0.842**	0.837**	0.837**	3.465***	5.519***	1.017	2.249***
	(0.068)	(0.067)	(0.067)	(0.048)	(0.048)	(0.048)	(0.334)	(0.289)	(0.132)	(0.311)
N	6,330	6,330	6,330	7,149	7,149	7,149	3,852	3,518	3,972	3,531
No. of regions	190	190	190	190	190	190	45	52	32	39
Log likelihood	−10311.639	−10294.547	−10285.884	−9695.455	−9668.806	−9666.781	−7915.468	−8055.508	−5690.737	−6473.660
R^2 (level 2)	0.079	0.112	0.193	0.035	0.082	0.098	0.021	0.142	0.061	0.128
R^2 (level 1)	0.049	0.064	0.096	0.025	0.040	0.044	0.020	0.066	0.021	0.052
ICC	0.316	0.308	0.283	0.156	0.148	0.145	0.137	0.141	0.033	0.053

Standard errors in parentheses. $* * *p<.001$, $**p<.01$, $*p<.05$. To obtain R^2 we follow the approach by Snijders and Bosker (1994). Other regressors include dummies on the role of right people and good education, political interest, generation 2, generation 3, poor area, self-employed, employee, unemployed, DK dummies.

inequality). This example illustrates that the same objective inequality index can be translated into divergent (and sometimes distorted) opinions across EU regions.

As for the relation between perceived and desired inequality (Fig. 2b), we can see that there is little correlation between these two subjective definitions of inequality. Moreover, people seldom wish inequality to be what they perceive it to be in their region.

Overall, the descriptive analysis allows us to summarize four key features of subjective inequality in the EU:

- **Fact 1:** At country level, the citizens express equality-seeking preferences despite underestimating actual inequality.
- **Fact 2:** From regional perspective, there is a clear discrepancy between actual and perceived inequality, while the underestimation of true inequality is more widespread than the overestimation.
- **Fact 3:** A similar value of actual inequality in regions does not imply convergence of people's perceptions.
- **Fact 4:** There is little correlation between perceived and desired inequality. Besides indicating that two subjective dimensions are conceptually very different, it might also signalize that people are

not satisfied with their perceived levels of inequality because their perceptions do not correspond to their wishes.

5.2. The determinants of subjective inequality

A discrepancy between actual inequality and people's perceptions, and our preliminary finding that there is a reverse link between the two types of inequality, requires further investigation by properly controlling for personal features and regional context.

The results of our baseline model for perceived inequality – columns 1–3 – and desired inequality – columns 4–6 – are reported in Table 4. To begin with, consider individuals' beliefs regarding the role of various factors to get ahead in life. Those respondents who believe that the "privileged-family" background is *not* important and hard work is important for being successful, perceive lower levels of inequality. By contrast, our results do not confirm any relation between the importance of connections (i.e. knowing the right people), good education, fairness of life outcomes and perceived inequality. Moreover, we do not observe any affect of such beliefs on the desired level of inequality.

From the other side, voting behavior is important. Left-wing voters perceive inequality to be higher, while right-leaning respondents, who have a top social status in the society and live in rich neighborhoods all wish higher levels of inequality. We do not find an effect of the top and middle social status positions on perceived inequality. However, there is a gender difference and a confirmed role of education: male respondents, post-secondary and tertiary degree holders report inequality to be higher. It is plausible that better educated citizens are also better informed about the problem of income inequality or possess better analytical skills. Unlike previous studies we do not find any difference between birth cohorts in how inequality is reported,[9] however younger adults, i.e. born after 1980, seem to be more inequality averse because of striving to lower levels of inequality.

Turning to regional characteristics, probably the most remarkable finding is that in the regions with higher actual $S80/S20$ ratio people report lower levels of it and also wish less inequality.

The baseline model offers some preliminary insights into the determinants of perceived and desired inequality. However, the results should be interpreted with caution due to the nested structure of our data. To further investigate between-region variability of inequality perceptions, we also estimate a hierarchical model (with random intercepts for better accuracy), where the upper level is the region and the lower one is the individual. Moreover, it is important to understand whether inequality perceptions can be elicited also from supranational perspective. Since perceptions are unobservable and subjective by definition, cultural differences might affect (*i*) how people perceive income inequality in general, and (*ii*) their reaction to objective signals of an unequal distribution, i.e. actual income inequality in their region.

To check this, we draw a subsample of regions to identify specific patterns of perceived and desired inequality there. For this purpose, we predict the region-specific (level 2) residuals from the null model and divide the whole pool of observations into quintiles according to the value of the obtained residuals. We focus on two groups of regions - with the highest (Q5) and the lowest (Q1) values of residuals. The Q1 group mostly includes regions in Eastern and Southern Europe (e.g. Bulgaria, the Czech Republic, Hungary, Poland, Italy, Romania), while Q5 encompasses regions in Northern and Western Europe (e.g. Austria, Belgium, Germany, Sweden, the UK).

The estimation results for the whole sample and two groups of regions according to predicted residuals are summarized in Table 5. The models perform slightly better for perceived inequality than for desired inequality; the latter seems therefore harder to predict with "traditional" explanatory factors coming from the literature. The ICC value in models

without regional context variables (columns 1 and 4 of the table) is around 0.32 and 0.16 for perceived and desired inequality respectively. It suggests that the variance of inequality perceptions and desires is partly due to between-region differences, while the major share of variability is attributed to individual features.

When the regional features are added (columns 3 and 6 in the table), the ICC values become smaller suggesting that the variability of dependent variable due to region heterogeneity is to some extent accounted for by actual $S80/S20$ ratio and other context variables.

Importantly, individual variables mostly keep their sign and significance in the multilevel model for the whole sample. In particular, male respondents, people with left-leaning political views and better educated perceive more inequality, while right-leaning voters, who live in rich areas and males wish higher levels of inequality. Hence, we observe a gender difference but not an age difference in two types of subjective inequality. Intuitively, respondents who are concerned about current income differences prefer less unequal income distribution. Among variables capturing people's attitudes only belief about non-importance of wealthy family background is significant and negative for perceived inequality. Probably the most striking result is that, even in the multilevel model, a negative link between actual $S80/S20$ ratio in the region and two types of subjective inequality is observed.

Focusing on the restricted sample according to region-specific residuals offers several interesting results. To begin with, believing that a wealthy family background is *not* important to get ahead is negatively related to perceived inequality in Q5 but not in Q1 group of regions. Although left-wing views are not confirmed in the restricted sample, people with the top social status perceive lower levels of inequality in Q1 but not in Q5. Similar patterns occur for the prosperity of the area and a gender difference, which are positive and significant only in Q5 group. The effect of better education on inequality perceptions is again observed only in Q5. Higher actual inequality in the region is associated with lower perceived inequality in Q5, but the effect is not present in Q1.

Turning to desired inequality (columns 9 and 10 of the table), citizens who have less tolerance towards existing income differences wish less inequality only in Q5 group. Therefore, in their "ideal world" a society should be more egalitarian. Moreover, respondents who are top- or middle-ranked according to their social status wish higher levels of inequality in Q1, but these variables are insignificant in Q5. Finally, actual inequality is positively related to desired inequality in Q5 remaining insignificant in Q1. These important differences between the whole and restricted samples might indicate an unobserved heterogeneity affecting subjective inequality, which is in line with the existing literature (Bavetta et al., 2019).

6. Discussion

The aim of this paper was to study the relation between three dimensions of inequality, namely actual, perceived and desired inequality. Importantly, we aimed at investigating if there is a mismatch between different definitions of inequality in the EU. Moreover, this study was designed to shed light on the regional patterns of objective and subjective inequality.

Overall, our findings contribute to the literature on objective and subjective inequality across and within Member States of the EU. Firstly, we show that different dimensions of inequality do not appear to be as coherent as previously thought. Importantly, and also surprisingly, we found that actual and perceived inequality often go in opposite directions, which is also observed from the regional perspective. This finding is linked to an ongoing discussion about rising inequality and people's perceptions. Although some recent studies have described a positive relation between objective definitions of inequality and people's perceptions (OECD, 2021; Kuhn, 2020; Colagrossi et al., 2019; Xu & Garand, 2010), we have found a negative association between these two dimensions, which confirms the findings by Brunori (2017). Consequently, depending on a specific context, actual inequality does not seem to be perfectly mirrored by perceived inequality, and vice

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[9] We have also tested age and age squared and did not observe any significant relation between these variables and two types of subjective inequality.

versa. This finding is broadly supported by the existing literature that has described a country-level discrepancy between actual inequality and people's perceptions (Bussolo et al., 2021; Bavetta et al., 2019; Choi, 2019; Gimpelson & Treisman, 2018; Engelhardt & Wagener, 2017; Hauser & Norton, 2017).

Secondly, our study shows a divide between male and female respondents, those with secondary and tertiary education, and in some cases also between citizens with top and bottom social status. Socio-demographic variables are well-described predictors of perceived inequality as demonstrated by the recent stream of research (Knell & Stix, 2020; Bobzien, 2020; Bavetta et al., 2019; Dawtry, Sutton, & Sibley, 2015; Loveless & Whitefield, 2011). Moreover, we find an initial indication of a North–South divide in how inequality is perceived in the EU. To the best of our knowledge, this result has not been reported by the existing studies.

Our findings also highlight a role played by beliefs and attitudes for inequality perceptions. In particular, we show that when people believe in meritocratic principles of income distribution, they also tend to perceive lower level of inequality, which is in line with the so-called paradox of inequality (Mijs, 2021). Our results also show that political interest and voting behavior are essential for inequality perceptions. In fact, respondents with left-leaning political views report inequality to be high, which fits well with the existing findings in the field (Bobzien, 2020; García-Castro, Rodríguez-Bailón, & Willis, 2020; Bavetta et al., 2019).

As for the second subjective dimension – desired inequality – is not easily described with the common predictors. It is commonly hypothesized in the literature that voting preferences affect people's desired inequality. In particular, left-leaning voters should be more inequality-averse and egalitarian compared to right-leaning ones (Müller & Renes, 2021; Kerschbamer & Müller, 2020). In fact, we find a confirmation of this idea because the supporters of right parties also strive to higher levels of inequality. From the other side, the majority of respondents prefer an egalitarian distribution of income in the EU, which is in line with evidence for the US citizens (Norton & Ariely, 2011). Despite these findings, the picture remains far from being complete. The standard socio-demographic variables and regional characteristics are not able to fully explain what drives people's desired inequality, requiring therefore more in-depth research to understand what affects people's "ideal world".

Our results also offer preliminary evidence that the determinants of subjective inequality might share common roots at supranational level, while cultural factors can be responsible for the discrepancy between different definitions of inequality. However, this result should be interpreted with caution due to the change of the sign and/or the significance level for some determinants. For instance, the most interesting and surprising result of a negative relation between actual $S80/S20$ ration and perceived inequality is confirmed only for regions in Northern and Western Europe (Q5 group). It is also possible that the respondents from Eastern regions of the EU consider similar factors – which might not be a primary choice of those from Western regions – when thinking about income inequality. Therefore, unobserved heterogeneity seems to play a vital role for inequality perceptions and desires.

Several limitations of our study need to be acknowledged. First, the discrepancy between actual inequality and people's perceptions might be, to some extent, attributed to slightly different definitions behind these concepts. In particular, actual $S80/S20$ ratio measures inequality among households using equivalised disposable income data, while the survey questions on subjective inequality require the respondents to think in terms of individuals. Second, this study has shown that some respondents' answers about their perceived and desired inequality were inconsistent. Consequently, our sample for analysis was reduced to the

consistent values of perceived and desired $S80/S20$ ratios. This inconsistency of responses might further indicate that percent-based questions to grasp perceptions and desires seem to be challenging for the respondents. To increase the precision of perceived and desired inequality metrics, the interested stakeholders might use alternative approaches, for instance graphical representation, in conjunction with percent-based questions. Third, although the Eurobarometer survey is nationally representative of the target population of the EU, its regional representativeness is not guaranteed, while our sample has several regions with a few observations inside. Our principal analysis includes such regions, and we have tested whether their exclusion can affect the results. For this purpose, we have run the multilevel model excluding the regions with less than five individual cases.[10] Although, the obtained results do not change from the main analysis discuss in the paper, the representativeness of the sample at regional level remains a critical issue.

7. Conclusions

Inequality is an ever-debated topic. Its everlasting success in both the academic and policy fora is also due to the fact that, despite all the efforts made, inequality is increasing rather than decreasing, and this is true at both macro-level (countries) and more micro-level (regions within countries).

One of the key issues when discussing inequality is its definition (and measure). There are objective and subjective definitions of inequality and, although it makes sense for policies to be devised according to objective metrics, the importance of subjective measures of inequality – and their relationship with objective ones – is often underplayed. How people subjectively perceive inequality has important implications for the good functioning of a society.

Our paper aims at contributing to the debate on inequality by comparing an objective measure of inequality, based on income distribution, with two other subjective definitions of inequality, i.e. perceived and desired inequality. People's perception of inequality represents their reading of the actual situation, while desired inequality is what they wish for the future and, as such, clearly has a normative, rather than just a positive, connotation linked to one's values.

Maybe contrary to expectations, we found that actual and perceived inequality do not go hand-in-hand. In fact, perceived inequality is often higher where actual inequality is lower. Cultural factors seem to be at play in this, with a strong North–South divide in Europe. Northern countries, while being more equal, is where people still perceive inequality as a problem. The opposite holds for Southern Europe. To better understand this phenomenon, we also considered the subjective desired level of inequality and we found that similar factors determine both perceived and desired inequality, although the latter is more difficult to predict with standard explanatory variables highlighted in the literature. It is possible that more idiosyncratic features are at work when it comes to individual wishes.

Although much needs to be studied, we believe our results are pivotal in highlighting the multi-faceted nature of inequality (and its definitions) and the need to reflect on which definition to use in a specific context or problem, since the different definitions are not as closely related as once thought.

CRediT authorship contribution statement

Alessandra Faggian: Conceptualization, Writing - original draft. **Alessandra Michelangeli:** Conceptualization, Methodology, Writing - original draft, Writing - review & editing. **Kateryna Tkach:** Software, Formal analysis, Visualization, Writing - original draft, Writing - review & editing.

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[10] These results are not included in the paper and are available upon request.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Additional tables and figures

Table A1 and Figs. A1–A3.

Table A1
Description of variables.

| Variable	Definition	Source
Subjective inequality		
Perceived inequality	People's perceptions of after-tax income inequality in 2017, measured by $S80/S20$ ratio	Eurobarometer
Desired inequality	People's wish for after-tax income inequality in 2017, measured by $S80/S20$ ratio	Eurobarometer
Individual variables		
Fairness	Most of the things that happen in my life are fair, from 1 = strongly disagree to 5 = strongly agree	Eurobarometer
Wealthy family	Role of wealthy family background (5-point Likert scale)	Eurobarometer
Imp.	=1 if strongly agree or agree; 0 otherwise	
Avg.	=1 if neither agree nor disagree; 0 otherwise	
Not imp.	=1 if strongly disagree or disagree; 0 otherwise	
Right people	Role of knowing the right people (5-point Likert scale)	Eurobarometer
Imp.	=1 if strongly agree or agree; 0 otherwise	
Avg.	=1 if neither agree nor disagree; 0 otherwise	
Not imp.	=1 if strongly disagree or disagree; 0 otherwise	
Hard work	Role of working hard (5-point Likert scale)	Eurobarometer
Imp.	=1 if strongly agree or agree; 0 otherwise	
Avg.	=1 if neither agree nor disagree; 0 otherwise	
Not imp.	=1 if strongly disagree or disagree; 0 otherwise	
Good education	Role of having a good education (5-point Likert scale)	Eurobarometer
Imp.	=1 if strongly agree or agree; 0 otherwise	
Avg.	=1 if neither agree nor disagree; 0 otherwise	
Not imp.	=1 if strongly disagree or disagree; 0 otherwise	
Political interest	Index summarizing discussion of national, European and local political matters, from 1 = no interest to 4 = strong interest	Eurobarometer
Left	=1 if on steps 1–4 of left–right placement scale; 0 otherwise	Eurobarometer
Center	=1 if on steps 5–6 of left–right placement scale; 0 otherwise	Eurobarometer
Right	=1 if on steps 7–10 of left–right placement scale; 0 otherwise	Eurobarometer
Income differences	Differences in people's incomes are too great, from 1 = strongly disagree to 5 = strongly agree	Eurobarometer
Top	=1 if on the top (7–10) of a ten-step social status ladder; 0 otherwise	Eurobarometer
Middle	=1 if on the middle (4–6) of a ten-step social status ladder; 0 otherwise	Eurobarometer
Bottom	=1 if on the bottom (1–3) of a ten-step social status ladder; 0 otherwise	Eurobarometer
Poor area	=1 if the neighborhood is reported to be very or fairly poor; 0 otherwise	Eurobarometer
Rich area	=1 if the neighborhood is reported to be very or fairly rich; 0 otherwise	Eurobarometer
Gender	=1 if male; 0 otherwise	Eurobarometer
Generation 1	=1 if born between 1946 and 1964; 0 otherwise	Eurobarometer
Generation 2	=1 if born between 1965 and 1980; 0 otherwise	Eurobarometer
Generation 3	=1 if born after 1980; 0 otherwise	Eurobarometer
No or primary	=1 if no education or primary education completed; 0 otherwise	Eurobarometer
Secondary	=1 if secondary education completed; 0 otherwise	Eurobarometer
Post-secondary	=1 if post-secondary education completed; 0 otherwise	Eurobarometer
Master	=1 if master's degree or higher; 0 otherwise	Eurobarometer
Employee	=1 if employed; 0 otherwise	Eurobarometer
Self-employed	=1 if self-employed; 0 otherwise	Eurobarometer
Not working	=1 if looking after the home, studying, retired or unable to work; 0 otherwise	Eurobarometer
Unemployed	=1 if unemployed; 0 otherwise	Eurobarometer
Regional variables		
GDP p.c.	GDP per inhabitant in Purchasing Power Standard (PPS)	Eurostat, OECD, ONS (UK)
Poverty (%)	Share of people with equivalised disposable income below 60% of the national median - at-risk-of-poverty rate	Eurostat, OECD, ONS (UK), Statistics Portugal
Unemployment (%)	Unemployment rate among people aged 15 to 74 years	Eurostat, OECD
Actual inequality	Actual income inequality, measured by $S80/S20$ ratio	Eurostat, OECD, Statistics Portugal
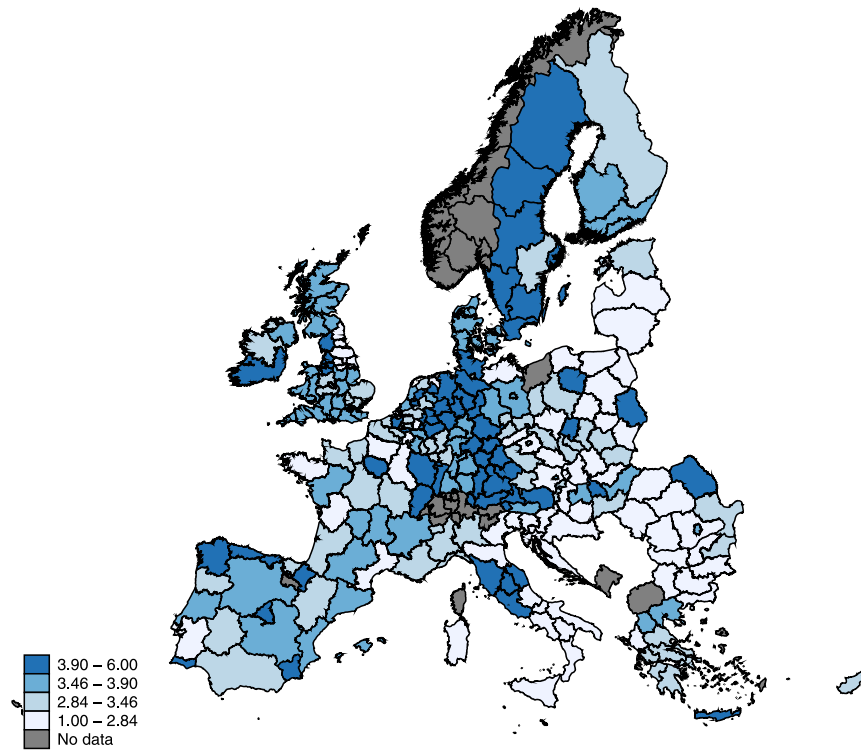
Fig. A1. Perceived income inequality (*S*80/*S*20 ratio) in EU regions. *Note:* for Germany and the UK the data are available at NUTS 1 level of regions. *Source:* authors' calculations based on the Eurobarometer survey.
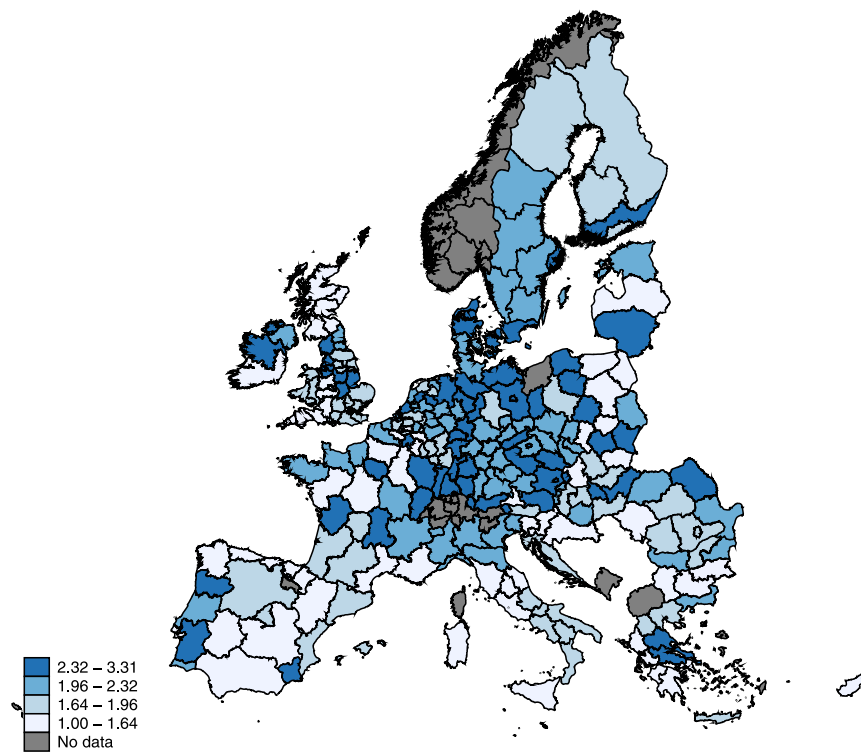
Fig. A2. Desired income inequality (*S*80/*S*20 ratio) in EU regions *Note:* for Germany and the UK the data are available at NUTS 1 level of regions. *Source:* authors' calculations based on the Eurobarometer survey.
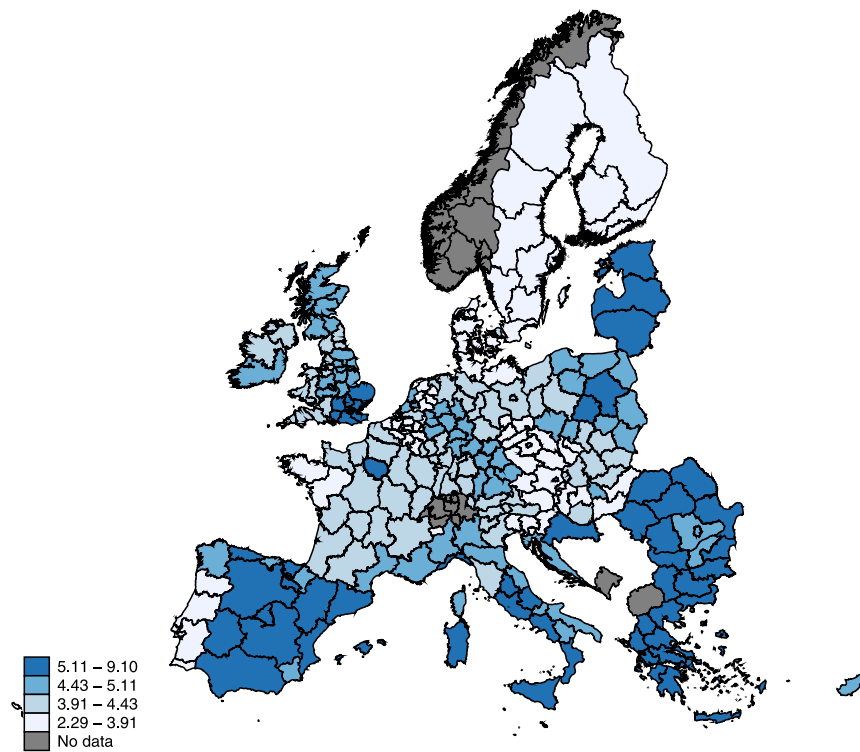
Fig. A3. Actual income inequality (*S*80/*S*20 ratio) in the EU regions *Note:* actual income inequality ratio refers to the year 2013, except France (2010), the UK (2011) and Portugal (2015). For Belgium, Germany, Greece, Poland and the UK actual inequality data are available at NUTS 1 level. *Sources:* the OECD, Eurostat and Statistics Portugal.

Appendix B. Sample description

Our sample encompasses 190 regions in 28 countries, members of the EU in 2017. The countries in our sample include Austria ("AT"), Belgium ("BE"), Bulgaria ("BG"), Republic of Cyprus ("CY"), the Czech Republic ("CZ"), Germany ("DE"), Denmark ("DK"), Estonia ("EE"), Greece ("EL"), Spain ("ES"), Finland ("FI"), France ("FR"), Croatia ("HR"), Hungary ("HU"), Ireland ("IE"), Italy ("IT"), Lithuania ("LT"), Luxembourg ("LU"), Latvia ("LV"), Malta ("MT"), the Netherlands ("NL"), Poland ("PL"), Portugal ("PT"), Romania ("RO"), Sweden ("SE"), Slovakia ("SK"), Slovenia ("SI"), and the United Kingdom ("UK").

We merge data from the Eurobarometer survey (2017) with the data on regional economic indicators using the data from Eurostat, the OECD and some national statistics offices. NUTS 2 classification for the year 2013 is our benchmark to merge the data from the survey with the dataset on regional indicators. We reconstruct this regional classification from lower level (NUTS 3) or substitute regional codes listed in the survey with NUTS 2 classification valid for 2013 when necessary. As for Germany and the United Kingdom the survey data are available at NUTS 1 level. Therefore, we refer to this regional level when merging the Eurobarometer data with the dataset on regional variables.

Actual *S*80/*S*20 ratio is available at NUTS 2 level for most countries and in general refers to the year 2013. However, for France actual inequality data are available for 2010, the United Kingdom for 2011, and for Portugal for 2015. Furthermore, for Germany and the United Kingdom actual inequality data for NUTS 1 level are used for the purpose of consistency with the survey data (as indicated above), while for Belgium, Greece and Poland NUTS 1 level is used due to availability of actual inequality data at this level. Finally, the data on actual income inequality are not available for three NUTS 1 regions in Germany, namely Bremen ("DE5"), Hamburg ("DE6") and Saarland ("DEC"), reducing the sample by 29 and 46 observations for perceived and desired inequality respectively.

At-risk-of-poverty (AROP) rate defines citizens with an equivalised disposable income below the threshold specified at 60% of the national median equivalised disposable income. The AROP rate is given in percentage of total population. For most countries it is available for 2013, except the United Kingdom and Portugal where the data refer to 2017. Moreover, for Belgium the data are available for NUTS 1 level of regions.

Unemployment rate is specified among male and female citizens from 15 to 74 years in the year 2013. The GDP per inhabitant in purchasing power standard (PPS) is measured in thousand euros and refers to the year 2013 for all countries.

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