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(Mis-)perception of Inequality: measures, determinants and consequences

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Abstract

Despite being considered by many to be harmful for society, inequality has been rising in the past decades. How people experience the level of inequality may be different from the objective levels of inequality. In this literature review we systematically revisit common elicitation methods of perceived inequality and find that they lead to quite different conclusions. Yet, it is clear that most people's perceptions of inequality are biased. Individuals' past experience and exposure to local inequality, have profound impact on subjective perception of inequality and on redistribution preferences. Positive expectations about upward mobility explain lack of support for redistribution.

1 Introduction

Inequality is arguably one of the most pressing challenges of our time. A recent study by Oxfam (2020) documents that the total wealth held by world's 2,153 billionaires was \$8.7 trillion in 2019, making them wealthier than 50% of the population worldwide. Conversely, almost half of the world's population still lives on less than \$5.50 a day according to the World Bank (2018). In fact, the wealth of the bottom half of all adults in the world amounts to less than 1.8% of the total global wealth (Credit Suisse, 2019).

The trend of inequality development is worrisome. Both income and wealth inequality has been rising continuously since the 1980s (Piketty and Saez, 2014). The top 10% earners in the U.S. and Canada in the 1980s captured about 35% of national income, whereas the same measure raised to 47% in 2016. The trend is less steep in Europe but still relevant: it was about 32% in 1980 and increased to 37% in 2016 (World Inequality Report, 2018). The concentration of wealth is much greater than the concentration of income. The share of total net private wealth owned by the top 10% wealthiest Americans and Europeans raised from 67% and 59% respectively in 1980 to 72% and 64% in 2010 (Piketty, 2014, ch10), leaving less for the rest of the 90% to share.

The ever-rising economic inequality since the 1980s has been at the central stage of recent political debates and academic discussions, especially after the Covid pandemic, for its negative effects on social outcomes. First, inequality is thought to be divisive and detrimental to social cohesion (Stiglitz, 2012). Societies with greater inequality typically exhibit lower level of social trust and trust in government (Alesina and La Ferrara, 2002; Pickett and Wilkinson, 2010; Larsen, 2013). Vergolini (2011) uses data from the European Social Survey 2002 and finds strong negative correlation between economic inequality and social trust and trust in institutions, a result echoed by d'Hombres et al. (2013). Furthermore, Paskov and Dewilde (2012) apply multilevel analysis for 26 European countries and find that people in more unequal countries are less willing to take action to improve the living conditions of their fellow citizen. Second, countries with higher inequality typically see worse education and lower social mobility (Pickett and Wilkinson, 2010; Corak, 2013; Pfeffer, 2018), which may exacerbate the prevailing inequality issues in the long run. Third, a high level of inequality may also aggravate political instability and even undermine democracy (Alesina and Perotti, 1994; Acemoglu and Robinson, 2006). In Europe, the Eurobarometer from 1975 to 2009 shows that rising inequality has been fueling Euroscepticism (Kuhn et al. 2016). In Egypt, Verme (2014) documents a strong decay in the perception of equality prior to the Egyptian revolution of 2011. These negative consequences of inequality may eventually threat economic growth (Birdsall et al., 1995; Banerjee and Duflo, 2003; and Neves et al., 2016 for a meta-study) and ultimately lead to shorter, unhealthier and unhappier lives as well as more societal conflicts (Fajnzylber et al., 2002; Alesina et al., 2004; Pickett and Wilkinson, 2010;).

Addressing poverty and inequality has been one of the top priorities in many international organizations such as the European Commission, United Nation, World Economic Forum. It has been considered as one of the greatest concerns for mankind (Pew Research Center, 2014). For governments, one obvious way to mitigate the inequality problem is to redistribute income and wealth in society. Standard political economy models predict that a rise in inequality will lead to higher demand for redistribution (e.g., Meltzer and Richard, 1981). Surprisingly, despite its appealing prediction, it hardly bears out in reality as the demand for redistribution is rather modest in high inequality countries. For instance, Lupu and Pontusson (2011, p. 316) write that "current consensus... [is] that inequality does not matter for the politics of redistribution, at least not in any direct and particularly significant way." Similarly, Ansell and Samuels (2011, pp. 2–3) find that "results have consistently called into question... that pressures for redistribution increase with inequality." The literature offers several explanations why people, especially the poor, do not demand for more redistribution. For instance, people's belief of upward mobility may discourage them from doing so (Piketty, 1995; Ok and Bénabou, 2001). Moreover, different beliefs about the fairness of social competition and ideology will also influence social choice of redistribution (Alesina and Angeletos, 2005a, 2005b; Alesina, Cozzi, & Mantovan, 2012; Starmans et al., 2017). Therefore, a fundamental question is: do people actually know the degree of inequality in society and their objective standing on the socio-economic ladder? Arguably, it is the perception of inequality, more than the actual one, that matters for redistribution preferences (e.g., Gimpelson and Treisman, 2017; Hauser and Norton, 2017). It has been shown that individuals are often unsure about the levels of inequality in their country (Gimpelson and Treisman, 2017; Hauser and Norton, 2017).

In this report, we aim at providing a comprehensive review of the recent literature on inequality perception. We explore various methodologies introduced in the literature that measure individuals' perceptions of inequality in the field. We discuss advantages and disadvantages of various elicitation methods in terms of their theoretical attractiveness and feasibility. It turns out that different measurements lead to quite different

conclusions in terms of perceived inequality. For instance, Norton and Ariely (2011) ask respondents to indicate what percent of the nation's total wealth is owned by individuals on different wealth quintiles. They find that Americans tend to underestimate inequality. Such method has been criticized by Eriksson and Simpson (2012) who find the opposite. Their data suggests Americans actually overestimate the degree of inequality, a result echoed by Chambers et al. (2014). We also review how large international surveys elicit the perception of inequality. For example, the well-established International Social Survey Programme (ISSP) asks respondent to estimate earnings for people who have different occupation, ranging from a chairman of a large national company to an unskilled factory worker. Moreover, respondents were asked to self-evaluate their social position, which is often used in the literature as a measure of perceived income distribution (e.g., Niehues, 2014 or Gimpelson and Treisman, 2017). Empirical studies based on these types of questions typically conclude that Europeans overestimate the degree of inequality in their countries, while the picture for Americans it is less clear, depending largely on the elicitation methods employed.

Understanding how the perception of inequality is determined is crucial for policymakers who steer the economy. Because when citizens hold misperceptions about the prevailing levels of inequality, social and political outcomes may be biased as well. For instance, both Cruces et al. (2013) and Karadja et al. (2017) find that when providing respondents with the objective level of inequality in society, those who underestimate their economic positions in society become less supportive for redistribution. It is not a trivial task for individuals to have an objective view of the income and wealth distribution. People have to infer the entire income and wealth distribution from limited samples that they observe. How well this inference can be done depends on individuals' ability, education, family background, media exposure, etc. How individuals perceive the inequality situation in their country ultimately affect their redistribution preferences.

The rest of the paper is organized as follows. Section 2 is devoted to the measurement and determinants of the perceptions of inequality. Section 3 compares perception of inequality in Europe and the US. Section 4 discusses factors that affect perception of inequality. Section 5 focuses on how inequality perception affects redistribution preferences. We summarize the main findings and conclude in section 6.

2 Perception of inequality

Empirical evidence documents that individuals' perceptions of inequality are usually quite far off from reality (e.g., Norton and Ariely, 2011; Norton et al., 2014; Kuhn, 2011, 2016; Niehues, 2014). This has far-reaching implications for theories of redistribution and policy making (Engelhardt and Wagener, 2014; Knell and Stix, 2017; Gimpelson and Treisman, 2018). Some studies suggest that subjective inequality perceptions appear to be better able to explain attitudes toward inequality and redistribution preferences than objective measures of inequality (e.g., Kuhn, 2015; Choi, 2019).

We first discuss how to measure perception of inequality empirically and compare whether different measures lead to different results. We discuss if there is any general pattern of misperception of inequality in Europe and in the USA and discuss the reasons behind the manifested disparity. Lastly, we review articles that document how the redistribution preferences change when individuals' misperceptions are corrected, by providing them with accurate economic distribution. These results imply that social outcomes may have been different if economic agents had a more accurate overview of the objective levels of inequality.

2.1 How to measure perception of inequality empirically

Measuring the perception of inequality is not a trivial task. Although some authors suggest that one may simply ask directly (Smyth and Qian, 2008), as we discuss in this section, results often depend on how the questionnaire is designed. In order to avoid biased answers, the questions should be clear, neutral, and concise enough to improve response rate while preserving a high quality of the survey. We review popular elicitation methods employed in the psychology literature and questionnaires employed in large international surveys and discuss the pros and cons of the various elicitation methods. Despite being different in methodology, these elicitation methods attempt to capture the following aspects of income/wealth inequality:

- How respondents perceive social inequality overall in terms of wealth/income distribution.
- Beliefs about salaries for different occupations in their country.
- Do respondents know how wealthy the rich really are in terms of income and wealth?
- Do respondents know the poverty level in their country?

2.1.1 Elicitation methods in the psychology literature

Perhaps one of the most cited paper in recent years on perception of inequality is the one by Norton and Ariely (2011). To measure perception of wealth inequality, the authors ask respondents to indicate what percent of wealth they thought is owned by each of the five quintiles of the population in their country (USA, in this particular paper and Australia in Norton et al., 2014). Participants are asked first about the top 20%, descending until the bottom 20%. When respondents fail to provide answers that sum up to 100%, the indicated percentage is normalized such that they sum up to 100%.

Figure 1 shows the results with horizontal bars representing the distribution. The bar at the top labeled Actual depicts the actual wealth distribution in the U.S. whereas the bar in the middle represents respondents' estimates. Clearly, for the case of the United States, respondents (N=5,522, nationally representative sample) largely underestimate the actual degree of inequality. They believe that the top 20% of Americans own 59% of wealth, while the truth is 84%. Similarly, they estimate the bottom 40% of the Americans own about 9% of total wealth, while the truth is they own only 0.3% in total, which is why the two bottom quintiles are not visible in Figure 1 (the bar at the top).

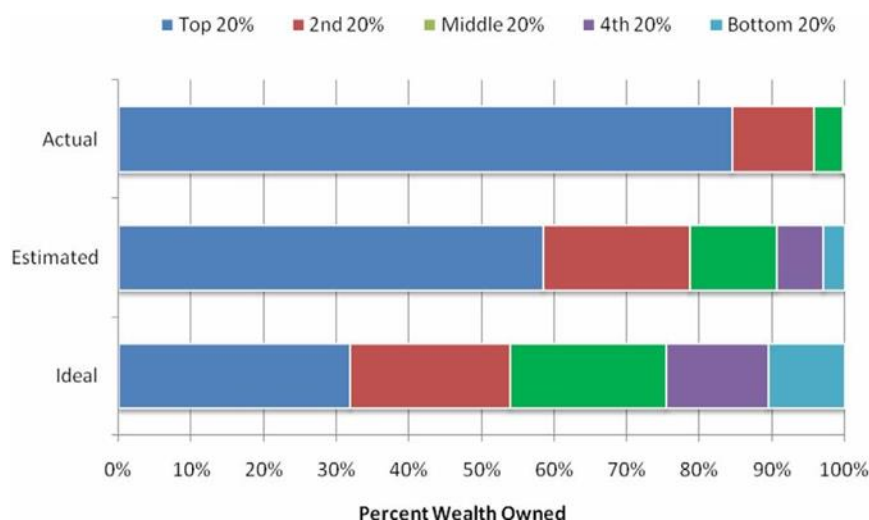


Figure 1 The actual U.S. wealth distribution at the time of the survey in Norton and Ariely (2011) against respondents' perception of inequality and ideal distribution.

The bar at the bottom depicts the ideal wealth distribution of Americans, which will be discussed below. This is based on responses on what should be the percentage of wealth owned by each quintile. It is interesting to observe that the Americans actually prefer a society that is much more equal than the one they live in.

Surprised by Norton and Ariely (2011)'s findings, Eriksson and Simpson (2012) reconsider the elicitation method employed by them and ask the question: are Americans really that far off from estimating the inequality in their society or are they actually influenced by the specific percentage measure used by Norton and Ariely? Eriksson and Simpson conjecture that coming up with a percentage of wealth may be computationally too demanding for average respondents. As a result, respondents rely on their heuristic and answer the question. A particular type of heuristic seems plausible here that the respondents are first anchored on an equal distribution by quintiles (20%), then make some (modest) adjustments from there, known as the anchoring-and-adjustment heuristic. This can best be illustrated by looking at the elicited ideal wealth distribution in Figure 1. When respondents were asked what percentage of wealth should be owned by the richest 20%, they were anchored on 20% first. Considering richest people probably should have earned a bit more than 20%, the final answer is roughly 30%. Similarly, middle classes are expected to have roughly 20% of the total wealth, which is far from the situation in reality.

To examine if the results in Norton and Ariely (2011) are really driven by this interfering heuristic, Eriksson and Simpson (2012) invite subjects to estimate quintile percentages for various domains (household wealth, teacher salaries, web page clicks) and find very similar responses, suggesting the anchoring-and-adjustment heuristic is at work indeed.

Eriksson and Simpson (2012) propose an alternative way of eliciting inequality perception that is designed to address the issue. They suspect that the cognitively demanding part of the quintile percentage measure is that individuals are asked to aggregate wealth. Therefore, they propose to ask individuals to estimate "What is (should be) the average household wealth, in dollars, among (the 20% richest) household in [the United States]?" for the top and bottom quintile. Their results based on average estimates show that Americans do not underestimate inequality in their society and have near-perfect egalitarian preferences. To put this result into perspective, when using the quintile percentage methods, respondents think that the richest 20% of households have 21 times the wealth owned by the bottom 20%, which is clearly far off from reality. The estimation obtained by the average method suggests that people believe the richest 20% households own 1,500 times the wealth owned by the bottom 20%. The true top to bottom ratio, as reported in Norton and Ariely (2011) is in the magnitude of 1,000:1, hence respondents exhibit a modest overestimation of inequality.

Chambers et al. (2014) in response to Norton and Ariely (2011) propose to reconsider American's perception of inequality again, but focussing on income, instead of wealth inequality. Following Eriksson and Simpson (2012), the authors refrain from asking respondents to aggregate income for some income groups, but only ask for point estimates such as average income or cutoff points for certain income groups. Three studies are included in Chambers et al. (2014), offering several ways of measuring income inequality as well as its trend.

The first study asks participants to estimate the percentage of all Americans whose annual incomes in [2010] fell into each of three categories: under [\$35,000, \$35,000 to \$74,999, and \$75,000] or above. In addition, as an alternative measure of inequality perception, respondents are also asked to estimate how much greater the incomes of [Americans] in the top 20% of the income distribution were compared with those in the bottom 20% in 1970, 1980, 1990, 2000, and 2010. To provide a baseline for these judgments, Chambers et al. informed participants that in 1967, this inequality margin was 11.13. The result shows that respondents overestimate the percentage of Americans who belong to the low-income and underestimate high-income group. Furthermore, they largely overestimate the trend of income disparity between the rich and poor. Thus, respondents over-estimate income inequality in the USA.

In the second study, Chambers et al. ask participants to directly estimate the average household incomes of [Americans] in both the top 20% and the bottom 20% of the income distribution in 1970, 1980, 1990, 2000, and 2010. As background information, participants are given the average non-inflation-adjusted income of the bottom 20% in 1967 (\$1,398) prior to making their estimates. It turns out that respondents have quite a good sense of income growth for the bottom 20%, but vastly overestimate the income growth of the richest 20% Americans. Thus, once again, respondents overestimate income inequality.

In the third study, Chambers et al. present participants with two multiple-choice questions. The first question concerns the top-income earners. To give some contextualization, the authors informed participants that the cutoff point of the top 20% earners was \$100,065. The question is, which one was the cutoff point for the top 1%? \$380,354 (the actual cutoff) or \$681,649 (an incorrect high cutoff). Similarly, the second question asks about the low-income cutoff. They provide respondents with the cutoff point for the bottom 20% (\$20,001) and ask whether the cutoff for the bottom 1% was either \$3,517 (the actual cutoff) or \$11,904 (an incorrect high cutoff). They find that the majority of respondents (76%) incorrectly think that the top 1% cutoff was the high one. Conversely, 63% of respondents correctly estimate the cutoff point for the bottom 1%. Overall, the three studies in Chambers et al. (2014) show that Americans overestimate income inequality, driven by the overestimation of the incomes of the top earners.

One may argue that although Norton and Ariely (2011) and Chambers et al. (2014) find opposite results in terms of inequality perception, they focus on different aspects of inequality, namely wealth versus income. Given that wealth inequality is much greater than income inequality in general (Piketty and Saez, 2014), it is not surprising that people underestimate wealth inequality. However, Eriksson and Simpson (2012) also estimate wealth inequality in their survey and find suggestive evidence that respondents tend to overestimate wealth inequality. Additionally, participants in Eriksson and Simpson (2012) clearly state that the average income elicitation method better reflects their true perception of inequality than the quintile percentage measure. Elicitation methods employed in well-established surveys

2.1.2 Elicitation methods employed in well-established surveys

Studies on perception of inequality and its consequences on redistribution preferences either use internationally renowned surveys conducted by third party research institutes or design their own questionnaires. In what follows, we discuss methods that are commonly seen in the literature.

Income inequality

Perhaps the most cited survey that measures people's perception of inequality is the International Social Survey Programme (ISSP). Established in 1984, the ISSP conduct large scale surveys on a number of topics ranging from family, work, religion, environment, social inequality, etc. We focus on the module called Social Inequality, which has five waves so far from 1984 to 2019, covering up to 45 countries worldwide. The first question concerns income inequality: "We would like to know what you think people in these jobs actually earn (or should earn in case the question is about ideal income distribution). Please write in how much you think they usually earn each year before taxes." Respondents are asked to estimate annual pretax income of a doctor in general practice, a chairman of a large national cooperation, a shop assistant, an unskilled worker in a factory, a cabinet minister in the [federal] government (the 1999 wave has more categories, such as lawyer, judge, etc). Thus, a full distribution of income perception can be depicted from the answers. A similar approach is adopted in the International Social Justice Project (ISJP). The ISJP is an international collaborative research initiative started in 1991. It has four waves (the funding stopped in 2007) with nationally representative sample in 1991, 1996, 2000, and 2006. The most recent survey covers Germany, Chile, the Czech Republic, and Israel. The survey was carried out via face-to-face interviews of citizens between the ages of 18 and 99 living in private households. To measure perception of inequality, subjects were asked (1)

What do you think a chairman or a managing director of a large corporation earns per month on average?; and (2) What do you think an unskilled worker earns per month on average? Schneider (2012) examine how perceived income inequality affects life satisfaction based on ISJP survey for the 2006 wave. Following Jasso (2007, p.236), the author calculates a ratio which gives information on the “distance” between the income of managers and workers (high status vs. low status) . This ratio is used as perception of inequality.

Societal inequality

The second question of the ISSP asks respondents to consider which of the social type best describes their country. The five diagrams and their corresponding descriptions are shown in Figure 2. A number of studies inferred subjective Gini coefficient from perceived social stratification.

In the 1999 wave, the ISSP also asked subject to self-assess where they stand in society. The question reads: “In our society there are groups which tend to be towards the top and groups which tend to be towards the bottom. Below is a scale that runs from the top to the bottom. Where would you rank yourself on this scale?” The response scale ranges from 1 (bottom) to 10 (top). This question is accompanied by other questions about income distribution, tax fairness, and conflicts between different groups of society. The Life in Transition Survey (LiTS) asks essentially an identical question. LiTS is an internationally oriented survey focusing on economic transition, covering 30 emerging countries and 5 advanced European economies. Respondents were asked to indicate which decile in the national income distribution they thought they fell into. The World Values Survey (WVS) includes a similar question, asking respondents their ranking on the income scale (on a 10-point scale) and their social class (out of five predefined classes). The aggregated data aim at showing a full picture of perceived income distribution. Lastly, another common way to ask the question is: “How many percent of the [nationality] population (18 years or older) do you think have a total annual income which is lower than yours?” (see also Cruces et al., 2013; Bublit, 2016; Karadja et al., 2017; Engelhardt and Wagener, 2018 who ask similar questions).

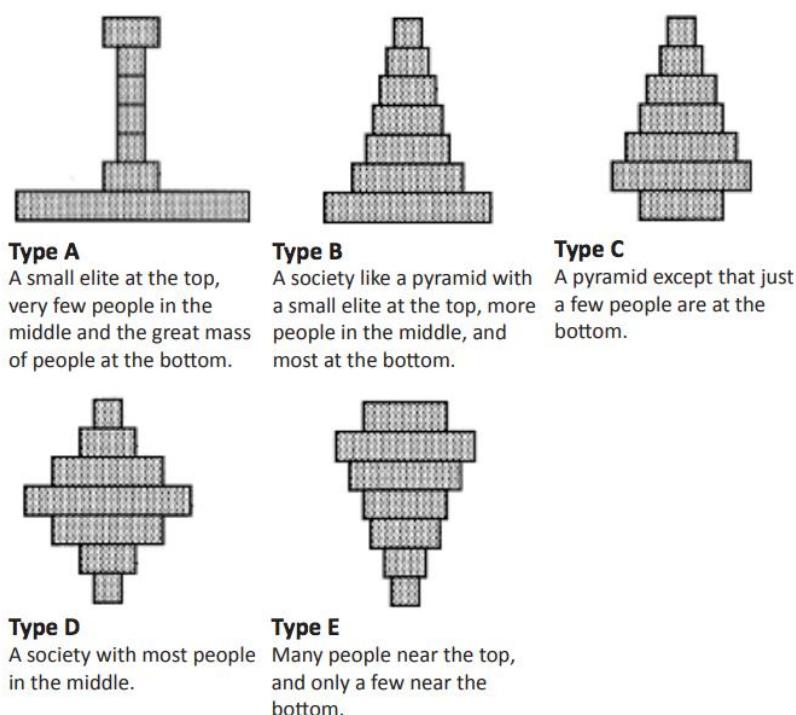


Figure 2 The ISSP question on social type with descriptions. The question goes "These five diagrams show different types of society. Please read the descriptions and look at the diagrams and decide which you think best describes <country>" Source: ISSP

The elicitation method described so far may be subject to the middle-class bias, whereby underestimating the degree of inequality. Moreover, the aggregate distributions of perceived inequalities heavily rely on the sampling methods and on the income and wealth distribution of respondents.

Wealth inequality

Another way to examine people's perception of inequality is to focus on the extreme rich. The polling firm Ipsos MORI asked residents from 29 countries what proportion of total household wealth in their country they thought the wealthiest 1% owned in 2015 (Ipsos MORI, 2015). Comparing the results with the correct figures collected by Credit Suisse, the majority of the respondents were wrong, often overestimated the degree of inequality. An average respondent was about 17% off, compared to the true answer (Gimpelson and Treisman, 2017, p.36).

Alternatively, other surveys focus on the poor. For instance, The 2010 Eurobarometer survey asked respondents what proportion of people in their country were poor. Comparing the answers either the EU-favored or the nationally defined level of poverty, almost one third of respondents' guesses was more than 10 percentage points off. The bias goes in both directions, either higher or lower than the true value (Gimpelson and Treisman, 2017, p.36).

2.1.3 Elaboration methods to quantify perception of inequality from surveys

We next discuss common ways to elaborate survey data in order to quantify perception of inequality.

Kuhn (2011, 2015) use the occupational wage task of ISSP surveys to calculate the perceived Gini coefficient. Instead of specifying wage and distributive frequency for all occupations, the author considers a simplified version where there are only two groups of earners, either top or bottom. The perceived Gini coefficient is given by the wage estimate of the top and bottom earners weighted by the share of either the top or the bottom earners in the population. More specifically, the estimated bottom earners' wage is calculated as the simple average of respondents' estimation of the blue-collar occupations. Similarly, the estimated top earners' wage is the simple average of the white-collar occupations. The fraction of individuals who belong to the bottom group of earners is estimated from the actual distribution of respondents' occupations in the sample (nationally representative adult samples in each participating country), which is given by the International Standard Classification of Occupations (ISCO) available in the ISSP dataset under demographics. The author suggest that more elaborated wage categories yield to similar results in terms of perceived inequality. Kuhn (2015) suggests that individuals tend to overestimate prevailing levels of inequality.

Niehues (2014) extend the question on social type in Figure 2 and use it to calculate the subjective Gini coefficient following a two-step approach. The first step aims to aggregate the responses to form a single distribution graph of social class. The combined graph is a weighted average of respondent's opinion on their society, with the weights being the frequency of choice for each graph. Using the aggregated distribution graph, the author can calculate the subjective Gini coefficient in the second step. More specifically, the seven classes are interpreted as an ordinal payoff scale from 1 to 7, representing a scale from low to high income/wealth. Knowing the share of population in each "payoff" category (income/wealth), following the Lorenz curve, the author can calculate an unstandardized, subjective Gini coefficient. The smaller the subjective Gini coefficient is, the lower the perceived inequality in society.

Choi (2019) criticized the method by Niehues (2014) for several reasons. First, the social type question was initially devised by the ISSP to measure social stratification, rather than income/wealth inequality. The former is a much broader concept than economic inequality. Second, as can be seen in Figure 2, the diagram only shows the five shapes of society, the sizes of the bars have no meaning. Third, the decision to use the scale 1 to 7 was ad hoc (notice, however, that some value has to be assumed to give a meaning to the graph).

Gründler and Köllner (2017) and Choi (2019) proposed an alternative method based on the respondents' perceived social position in a country. This measure takes into account respondents' own relative income assessment and thus it is better able to reflect subjects' perception of inequality. Having a full

distribution of self-perception of social position in a country, the authors can calculate the perceived Gini coefficient at the country level. However, this measure can be affected by the middle-class bias (Hoy and Mager 2019; Iacono and Ranaldi 2021) partly due to the influence of endogenous reference groups. If the rich underestimate their wealth and the poor overestimate it (e.g., Cruces et al., 2013; Gimpelson and Treisman, 2017), then this would create a peak around position 5 or 6 for the self-reported social position, which is self-evident in Choi (2019). This happens because the middle-class becomes salient when asking about the social position.

Similar to Choi (2019), Engelhardt and Wagener (2014) also use the ISSP question (see footnote 7) concerning social position. Likewise, they assume respondents' incomes largely determine the self-perceived social position. Aggregating individuals' self-assessment at country level, the author was able to plot the full distribution of perceived relative income, which is considered as a summary view on how society categorizes itself with respect to inequality. With this distribution, the mean-to-median ratio can be easily calculated, which serves as a measure of perceived income inequality. The higher the ratio is, the more unequal the society is perceived to be (assuming the income distribution is right-skewed). To capture the degree of misperception of inequality, the authors compare the actual mean-to-median value of income distribution from the OECD statistics with the perceived mean-to-median value. The ratio shows the degree of misperception. If the weighted perception is smaller (larger) than one, it means that people underestimate (overestimate) the degree of inequality in society. For the 26 OECD countries included in the sample, the authors find that the weighted perception ranges from 0.594 to 0.986, suggesting a considerable degree of underestimation of true inequality. Similarly, Engelhardt and Wagener (2018) look closer into the situation in Germany via a survey, employing 1,100 randomly selected households. The authors ask respondents to estimate how many households, in terms of deciles, have an equal or lower standard of living than themselves in Germany. Aggregating self-perceived relative income position, the authors find that low-income earners tend to overestimate their relative income position, while high-income earners tend to underestimate their position. Since the distribution of the bias is slightly right skewed, more people appear to be pessimistic about their personal financial standing. The author also employed the social stratification method to elicit inequality perception, as in the ISSP questionnaire. Again, similar to Choi (2019) method and Engelhardt and Wagener (2014), this method is subject to the middle-class bias.

Methodological Remarks

We have carefully discussed many popular methods employed in the literature. Each method has its own pros and cons, but we put together a few caveats applicable to designing survey questions. First, any method that encourages the anchoring and adjust heuristic should be avoided. Furthermore, one should bear in mind that asking respondents to give aggregate estimate (like cumulative wealth of the top 10%) is always more difficult than asking a point estimate such as the average income. Second, any elicitation method based on self-position on an equally divided society should take into account a possible middle-class bias. People seem to believe that they are either relatively richer or poorer than they actually are, which create an artificial peak for the frequency of the middle class. This is especially problematic when the mid-point is salient: such as being the middle class on the social ladder or an average earner.

In light of these points, it may be a good idea to ask respondents to estimate annual or monthly wage (depending on local convention) on different occupations, ranging from high to low status job, as in the ISSP survey. Then, Schneider (2012) or Kuhn (2011, 2015)'s method can be applied to calculate subjective Gini coefficient based on the estimated income and population distribution of these occupations. A caveat for this method is that estimated income by occupation should be weighted by the perceived distribution of each income category, rather than by the real distribution, to properly measure perception of inequality. Therefore, it may be a good practice to also ask respondents to estimate the proportion of people doing each type of job in their society. A misconception of this proportion is another source of bias when it comes to inequality perception.

3 Perception of inequality in Europe and in the U.S.

How does the perception of inequality compare with the actual level of inequality? We are interested in whether there is a systematic difference in inequality perception between U.S. and Europe. In contrast to U.S., European countries are typically characterized by a generous social welfare system, supported by relative higher tax schemes. We examine whether and how the misperceptions of inequality differ for people living in different welfare models.

For the case of United States, the results are rather mixed. We have discussed Norton and Ariely (2011) who find that Americans largely underestimate the degree of inequality in their country. The elicitation method employed by Norton and Ariely was challenged by Eriksson and Simpson (2012) and Chambers et al. (2014), who document the opposite, i.e., American actually overestimate both wealth and income inequality in their society. However, the results by Norton and Ariely (2011) are also echoed by other studies, Osberg and Smeeding (2006) and Kiatpongsan and Norton et al. (2014) document that Americans drastically underestimate the incomes of the executives (CEO). Further, Niehues (2014) takes the social stratification survey question (about the type of society) from the ISSP as a proxy for perception of income distribution, and find that Americans underestimate overall income distribution, although they do realize their society is rather unequal. Bavetta et al. (2019) also find supportive evidence that Americans underestimate inequality outcomes in terms of perceived income differences and conflicts between high/low occupations, social classes, rich and poor.

The findings for Europe appear to be more consistent. The articles reviewed below share the general view that Europeans are too pessimistic regarding the inequality level in their nations, they tend to overestimate how unequal their society is.

Niehues (2014) calculated the perceived Gini coefficient based on people's perception of society stratification using the ISSP data (see details in the previous section). She then compared the perceived Gini coefficient to the objective one calculated using the EU Statistics on Income and Living Condition (EU-SILC). She finds that Eastern Europeans largely overstate the degree of inequality in their society, assuming a pyramid shape of income distribution whereas the actual shape is closer to diamond, with most of the people lying in the middle. West and Southern European countries also overestimate the degree of inequality in their society, though overall to a lesser extent than the East Europeans. On the other hand, Scandinavian countries and Swiss citizens correctly perceived very low levels of inequality in their society. In fact, the actual distribution shows that their societies are even more equal than they thought. Gimpelson and Treisman (2017) refine the method introduced in Niehues (2014) and confirm her finding: almost all countries included in the sample overestimate inequality, but people in the U.S. underestimate it (see Gimpelson and Treisman's Appendix Fig. A1). Most of the results found in Niehues (2014) and Gimpelson and Treisman (2017) are echoed by Bavetta et al. (2019) as well.

Several authors use the self-perception of relative income. Bublitz (2016) review answers by citizens from five European countries (FRA, UK, GER, SPAN, and SWE) who are asked to estimate the percentage of individuals with a lower income than their own. They find that people from these Europeans countries underestimate how high their incomes actually are, and thus exhibiting a very pessimistic view about their self-perceived financial situation. In other words, inequality is perceived to be higher than it really is.

Engelhardt and Wagener (2018) also find that Germans tend to be too pessimistic in that they overestimate inequality in their society, believing that a large share of population is at the bottom, though the misperception seems to be less severe than documented by Niehues (2014).

Finally, Keller et al. (2010) use opinions on the current level of inequality as an indicator of the perception of inequality. The data is obtained from the Special Eurobarometer survey 2009. They find that a majority of European citizens considered income inequality to be too large.

4 What shapes perception of inequality

Individuals have very heterogeneous perceptions of inequality in society. It is, therefore, important to understand the factors that contribute to such misperceptions. This section shed some lights in this regard.

As noted by Cruces et al. (2013), the assessment of income distribution by an economic agent can be seen as a statistical inference problem. Agents observe a limited sample of the population and must infer the entire distribution from that information. This ability maybe influenced by how informed an individual is, how she constructs her reference groups, her own life circumstances (socio-demographics) and experience, cognitive ability, and media exposure etc. For instance, a high-income person maybe more likely to interact with other high-income people (friends, colleagues) and take them as her reference group. When extrapolating the income distribution of her reference group to the entire population, this high-income person maybe more likely to underestimate the proportion of people with lower income. Cruces et al. (2013) use the respondents' area of residence as a proxy of social reference group and find strong evidence that misperceptions of inequality are heavily influenced by reference groups. Karadja et al. (2017) find that those who consume more media and are more cognitively capable have less misperception regarding income distribution. Moreover, individuals with different characteristics may perceive and experience the levels of inequality in society differently. Poppitz (2018) and Bavetta et al. (2019) both employ data from the ISSP survey and discuss personal characteristics that strongly affect individuals' perception of inequality.

In Poppitz (2018), the latent variable of perceived inequality is inferred from the subjective social status as surveyed by the ISSP 2009, covering 18 European countries. The author applies Bourdieu's Capital Theory to explain perceived inequality. These explanatory variables can be broadly characterized by the economic capital (income and wealth), cultural capital (education and occupational prestige), and social capital (family background, employment status). The dependent variable uses the social stratification question in ISSP, asking respondents to self-assess where they stand on the social ladder. The data strongly support Bourdieu's Capital Theory in that economic, cultural and social capitals are all significantly influencing the perceived inequality in societies. In fact, the cultural and social capital jointly explain a similar portion of the total variance as income and wealth do. Moreover, the author also sheds some lights on the cross-country differences in perceived inequality. They find that average actual income differences between countries have little explanatory power. The GDP growth two years before the survey has a strong positive effect on the perception of inequality, suggesting that high growth rate may have exacerbated inequality. There is some suggestive evidence that in countries with low educational mobility (measured by private to public education expenditure), family background is positively associated with perceived social status.

Bavetta et al. (2019) use a novel approach that explicitly acknowledges the multidimensionality and "essential contestedness" of the perceived inequality. For instance, the perceived inequality could be reflected in outcome, in ex-ante opportunities and in fairness. The authors studied how observable individual characteristics affect the joint distribution of a set of indicators of perceived inequality in specific domains. The study employed the 2009 wave of the ISSP survey and it is restricted to 19 OECD countries worldwide. The empirical strategy involves a multivariate ordered logit model applied to a system of equations. The explanatory variables include age, gender, education, marital status, employment status, self-perception of own social status, experienced social mobilities (both ways), and political orientation. The authors find that respondents with higher income, social position, level of education, and stronger religiosity are less likely to perceive high levels of inequality in terms of outcome, opportunity, and fairness. On the contrary, respondents who lean to the Left in politics tend to jointly report more inequality in terms of outcome, opportunity, and fairness.

To summarize, inequality perceptions seem to be highly correlated with a number of observable characteristics. The most prominent ones are personal income, wealth, level of education, and perceived social status. These results constitute a useful guideline in designing new surveys to collect data on inequality perception.

5 Perception of inequality and redistribution preferences

Understanding what shapes individual perceptions on inequality is important. It turns out that what really matters for redistribution preferences is the perception, rather than the objective levels of inequality (Gimpelson and Treisman, 2017; Hauser and Norton, 2017; Kuhn, 2019). Furthermore, both Cruces et al. (2013) and Karadja et al. (2017) have shown that redistributive and political outcomes may have been different, had citizens possessed an objective view of income/wealth distribution. Individuals' personal experience and exposure to inequality also matters for redistribution preferences. Roth and Wohlfart (2018), based on survey data, find that individuals who have experienced higher levels of inequality in the past are less in favor of redistribution, controlling for common demographic variables. Sands (2017) also find that affluent individuals are not supportive of redistribution when being exposed to inequality. However, from the perspective of the less well-off, being exposed to inequality makes them more willing to demand for redistribution (Sands and de Kadt, 2019), except in extreme situations where people consider inequality to be inevitable (Pellicer et al., 2019).

Perceptions of income and wealth inequality describe people's view of the current distribution of resources in the society, but societies evolve and people may have optimistic expectations about their future position. They may underestimate inequality in opportunities and therefore being not supportive of redistribution: poor people today may think that in the future, they or their children will move up the social ladder.

Despite the rapid rising in income inequality since the 1980s in the U.S., Americans do not seem to demand more redistribution. One of the most compelling reasons for this is that people believe in high social mobility (Shariff et al., 2016). If the less well-off believe that they or their children will move up the income distribution, they would not support aggressive redistribution policy because it might end up hurting their future income. This is known as the Prospect of Upward Mobility hypothesis (POUM), which is formalized by Bénabou and Ok (2001). This hypothesis has been tested both experimentally and empirically. The POUM finds empirical support.

Rainer and Siedler (2008) establish a link between self-reported expectations of occupational mobility and preferences for redistribution using the German Socio-Economic Panel (SOEP). SOEP is a large scale, longitudinal survey of private household in Germany that has been widely used in social science. There are two questions in the panel that are directly related to redistribution preferences. The first question reads: "In Germany, everyone has to pay taxes in relation to his or her income. Those who earn more have to pay higher taxes (also known as 'progressive taxes'). What do you think: Is the amount of taxes paid by an unskilled worker in Germany too much compared to other groups, too little, or exactly appropriate?". The second question reads: "And what do you think about the taxes paid by a manager on the board of directors of a large company? Does he or she pay too much, too little, or an exactly appropriate amount in taxes compared to other groups?". Individuals demand more redistribution if they prefer a higher marginal tax rate for the manager and a lower marginal tax rate for the unskilled worker. Rainer and Siedler (2008) find that those who expect a pay rise within two years with more than 70% chance, they consider the marginal tax rate for a manager type of job to be too high. However, these people are also more likely to think that the marginal tax rate for an unskilled worker is too high.

Cojocaru (2014) employs the Life in Transition Survey (LiTS), which covers five western European countries and most countries of transition economies. For countries in the EU, there is a clear, negative association between expected upward movement on the social ladder and redistribution preferences. Importantly, this relationship holds if individuals' risk aversion is low. After all, a higher level of redistribution is a form of social security to protect individuals from income downfall (Duch and Rueda, 2015).

Guillaud (2013) examines individuals' redistribution preferences over 33 countries around the world and suggest that personal mobility plays a crucial role in redistribution preferences. The odds of demanding more redistribution are lifted by 32% for people who think they experienced a downward mobility within the last ten years. Moreover, the author also reports that individual labor market position (occupational status) and family income outweigh all other factors shaping preferences for redistribution.

6 Conclusions

Widespread increases in income and wealth inequality have been a long-standing challenge to our societies and have raised concerns about their impacts on political and social outcomes. Inequality can hardly be objectively measured when people form their beliefs on inequality based on their experience, information set, cognitive ability and media exposure. We review a number of prevailing methods of eliciting inequality perceptions and they often lead to different conclusions. For instance, when asking respondents to estimate their standing in national income/wealth distribution, less well-off people often think they are wealthier than they really are, and the well-offs think they are poorer than they actually are. Such effects of converging to the middle-class have been found in many papers reviewed in this study (e.g., Cruces et al. 2013; Niehues 2014, etc). However, when asking individuals to estimate the top earners' (top 20%) average income, individuals often overestimate the degree of inequality (Eriksson and Simpson, 2012; Chambers et al., 2014), except when they are asked to estimate the top 0.1% earners' income (Norton et al., 2014). An alternative method is to estimate wages for different job positions. A subjective Gini coefficient can then be calculated using the method introduced by Schneider (2012) or Kuhn (2015). We have argued that this method is the less inductive to biased answers. In fact, it asks respondents to express their beliefs without imposing a salient focal point, such as their own income, that might interfere with the estimation.

Empirical evidence based on surveys suggest that most Europeans tend to overestimate the prevailing inequality, while the results based on the American data are rather mixed. This is partly due to the fact that more studies have employed data from the U.S, adopting a wider range of methodologies.

Given that perceptions on inequality of outcomes and opportunities turns out to be more relevant than actual objective measures of inequality for redistribution preferences (Gimpelson and Treisman, 2017; Hauser and Norton, 2017; Kuhn, 2019), a deep understanding of factors that shaped the perceptions of inequality and a careful design of elicitation method is warranted.

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Figure 1 The actual U.S. wealth distribution at the time of the survey in Norton and Ariely (2011) against respondents' perception of inequality and ideal distribution. 6

Figure 2 The ISSP question on social type with descriptions. The question goes "These five diagrams show different types of society. Please read the descriptions and look at the diagrams and decide which you think best describes <country>" Source: ISSP 8

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