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How do people perceive income inequality?
A Czech case

Bachelor thesis

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Abstract

The widespread concern that the gap between the rich and the poor is continuously expanding prompts the stimulus for further examination. Standard theory suggests that the level of income inequality has a significant effect on policies with redistributive elements. However, empirical studies propose that rather than the actual shape of income distribution, individual perceptions of income distribution define the public finance models. Individuals tend to misperceive income inequality, yet there is little evidence regarding the origins of these perception biases. The bachelor thesis examines one of the possible theories that attempt to explain roots of misperceptions. The geographic reference group theory suggests that people project their local findings onto their estimates of overall income inequality. To test this hypothesis, we used the Gini coefficient with respect to country's districts as an explanatory variable and the subjective inequality index (Perceived inequality index) as a dependent variable. The empirical findings, nevertheless, provide little support for the geographic reference group theory as all regressions showed a highly insignificant relationship between district inequality and perceived inequality. The evidence suggests that respondents, who live in districts with high levels of income inequality relative to other districts do not necessarily perceive income inequality more critically.

Abstrakt

Všeobecné znepokojení, že se propast mezi bohatými a chudými neustále rozšiřuje, vyvolává podnět k dalšímu zkoumání. Standardní teorie naznačuje, že úroveň příjmové nerovnosti má významný vliv na míru přerozdělování. Nicméně, empirické studie navrhuji, že modely veřejných financí definuje spíše vnímání příjmové nerovnosti než skutečné rozdělení příjmů. Jedinci mají sklon vnímat příjmovou nerovnost mylně a původ tohoto zkresleného vnímání je z velké části neznámý. Tato bakalářská práce zkoumá jednu z možných teorií, které se snaží vysvětlit zdroj nesprávných představ o příjmové nerovnosti. Teorie geografických referenčních skupin navrhuje, že si lidé promítají své místní postřehy do odhadů o celkové příjmové nerovnosti. Pro testování této hypotézy jsme použili Gini koeficient, vypočítaný s ohledem na okresy, jako nezávislou proměnnou a subjektivní index vnímání nerovnosti jako závislou proměnnou. Empirické výsledky teorii geografických referenčních skupin nepotvrzují, jelikož všechny regrese vykazovaly nevýznamný vztah mezi okresní nerovností a celkovou vnímanou nerovností. Důkazy naznačují, že respondenti, kteří žijí v okresech s vyšší mírou příjmové nerovnosti, nemusí nutně vnímat příjmovou nerovnost kritičtěji vůči jiným okresům.

Keywords

inequality, biased perceptions, income distribution, geographic reference group theory

Klíčová slova

nerovnost, zkreslené vnímání, distribuce příjmu, teorie geografických referenčních skupin

Declaration of Authorship

I hereby proclaim that I wrote my bachelor thesis on my own under the leadership of my supervisor and that the references include all resources and literature I have used.

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Prague, 6 May 2018

Signature

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Bachelor Thesis Proposal

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| Proposed topic | How do people perceive income inequality? A Czech case |

Motivation

In recent years, there has been widespread concern that economic growth has not been fairly shared and the economic crisis has only widened the distribution of income. The gap between rich and poor is continuously expanding, and thus there is a need for further examination. The distribution of income can reveal quite useful information about the economy and economic development of a given country as it is one of the most important indicators of the well-being of its citizens. Unfortunately, an essential issue arises - there is a distortion between objective and perceived income distribution. Objective refers to data analysis received from official statistics, perceived refers to how people view the income distribution and their position in it.

Many studies have concluded (e.g. Engelhardt, Wagener, 2014) that there is an argument why empirical tests of the Meltzer-Richards hypothesis of redistribution and other research often appear to be inconclusive or negative. The crucial reason is that perceived levels of income inequality rather than objective income inequality play a vital role in the political economy and public finance, and thus they have a large impact on policy decision making.

There is a sufficient amount of evidence suggesting that people misperceive the income distribution (Cruces, Perez-Truglia, Tetaz, 2013). Individuals observe the levels of income from a very small fraction of the population and based on that information they deduce the entire income distribution. If they do not properly take into account the selection process, their conclusions will be systematically biased. This outcome may be caused by the limited amount of available information, failure of using information properly, or relative position within the reference group.

The last-mentioned reason induces issues in overall perceptions of income inequality but it may not be troubling for another hypothesis. This hypothesis claims that people have an accurate perception of income inequality in the region in which they live, rather than on a nationwide scale, after controlling for all independent variables. People usually make assumptions about income distributions based on the set of their individual interactions (i.e. from friends, family, co-workers). Their reference groups most probably live in the same area as them. Thus, they have a relatively precise notion about income distribution within the area of their residence.

Preliminary research questions

How does perceived and actual income differ across the Czech Republic?

Do people perceive income inequality better regionally?

Contribution

There is a large number of studies concerning perceived income inequality from different countries all around the world. However, there is a surprising lack of thorough up-to-date research in the Czech Republic. The aim of this bachelor thesis is at least partly to fill in the gaps and to analyse the current situation of perceived income distribution in the Czech Republic to determine whether there are larger inconsistencies in people's perceptions of inequality nationally than regionally, or whether the regional measure as an explanatory variable has no *ceteris paribus* effect on inconsistencies in people's perceptions.

Methodology

I will answer the questions mentioned above by analyzing available data for the Czech Republic. The core data that I plan to use are gathered from databases (SILC dataset) and from recent research on secularization and religious belief in the Czech Republic and Slovakia, Willard and Cingl (2017).

The principal aim is to compare data of objective income inequality and perceived income inequality and test whether there is a lesser distortion when the regional scale rather than the national scale is taken into account. The dataset from Willard and Cingl (apart from observations concerning religion and secularization which are not relevant for this bachelor thesis) includes the individual's income bracket, region and city of residence, individual difference measures on perceptions of equality and security in government institutions, and cognitive biases and credibility enhancing displays in the Czech Republic. These variables will serve very well for the purpose of testing the given hypothesis.

The first model is used to provide results from regressing actual income inequality on social expenditures, in various specifications. The second model contains a dependent variable: perceptions of equality in government institutions and independent variables: income bracket, region and level of education. Stronger social protection measures tend to be associated with more positive perceptions of government institutions, and thus there is a negative association between generalized trust in institutions and perceived income inequality (Stephany, 2015). This fact can be used to examine the results.

The bias is constructed as the level of objective income inequality minus the level of perceived income inequality. The desired goal is to determine whether the regional scale has an impact on perceived income inequality and whether this softens the bias after fixing all independent variables.

Preliminary outline

1. Introduction and problem setting
2. Overview of existing literature
3. Basic model
4. Data analysis, empirical research
5. Results
6. Conclusion

Bibliography

Alesina, Alberto, and Marios Angeletos. Fairness and redistribution: US versus Europe. Harvard Institute of Economic Research, Harvard University, 2002.

Cruces, G., Perez-Truglia, R. and Tetaz, M. (2013). Biased perceptions of income distribution and preferences for redistribution: Evidence from a survey experiment. *Journal of Public Economics*, 98, pp.100-112.

Engelhardt, Carina, and Andreas Wagener. "Biased perceptions of income inequality and redistribution." (2014).

Gimpelson, Vladimir, and Daniel Treisman. Misperceiving inequality. No. w21174. National Bureau of Economic Research, 2015.

Kuziemko, Ilyana, et al. "How elastic are preferences for redistribution? Evidence from randomized survey experiments." *The American Economic Review* 105.4 (2015): 1478-1508.

Norton, Michael I., and Dan Ariely. "Building a better America-One wealth quintile at a time." *Perspectives on Psychological Science* 6.1 (2011): 9-12.

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1 Introduction

In recent years, there has been widespread concern that the distribution of income has widened even more. The gap between the rich and the poor is continuously expanding, and thus there is a need for further examination. The distribution of income can reveal useful information about the economy and the economic development of a given country as it is one of the most important indicators of the well-being of its citizens. Furthermore, the level of income inequality is considered to have a significant effect on political decision-making. Standard theory suggests that countries with higher levels of inequality should redistribute more than equality-based nations, as a politically decisive agent will demand more redistribution. Overall, the income distribution is a useful economic indicator. However, an essential issue arises - there is a distortion between the objective and perceived income distribution. Objective refers to data analysis received from the official statistical office. Perceived refers to how people observe their position on a scale of income distribution and the general income inequality.

There is a sufficient amount of evidence suggesting that people misperceive the income distribution (Karadja *et al.* 2014; Norton and Ariely 2011; Kuhn 2015). Individuals observe the levels of income from a tiny fraction of the population and then deduce the entire income distribution based on that. Naturally, they know their level of income, but not necessarily their position on the scale of the income distribution. If they do not adequately take into account this selection process, their conclusions are systematically biased. The views and attitudes towards the distribution of income are inaccurate due to a diverse number of reasons. This bachelor thesis focuses on one of the possible theories that attempt to explain the inequality perception biases - geographic reference group theory.

Geographic reference group theory claims that although people misperceive income distribution on a nationwide scale, they have a comparatively accurate perception of income inequality in the region in which they live. People usually make assumptions about income distributions based on their

set of individual interactions with friends, family, co-workers, and others. Their reference groups most probably live in the same area as them. Thus, they have relatively precise notions about income distribution within their area of residence. Cruces *et al.* (2013) showed that respondents' income rank within their locality could explain a substantial variation in their perception of income distribution at the country level. Xu and Garand (2010) offer further support for the hypothesis that people project their local findings from the sub-population as if they were representative of the national population.

Therefore, the principal research question relates to whether the local inequality measure as an explanatory variable has *ceteris paribus* effect on discrepancies in people's perceptions. *Does perceived income inequality relate better to observed regional inequality?* Owing to the availability of dataset with Czech and Slovak respondents, we can compare perception disparities in these two countries. The second research question is as follows. *How do perceptions of inequality differ in the Czech Republic and Slovakia?*

There is a large number of studies concerning perceived income inequality from different countries all around the world. However, there is a surprising lack of thorough, up-to-date research in the Czech Republic. The principal aim of this bachelor thesis is to compare data of objective income inequality and perceived income inequality and test whether respondents generalise their reference groups based on the area of residence as if they represented the whole country.

I will answer the questions mentioned above by analysing data obtained from SILC dataset and the recent research conducted by Willard and Cingl (2017) on secularisation and religious beliefs in the Czech Republic and Slovakia. To test the geographic reference group hypothesis, in the basic model I use the Gini coefficient with respect to country's districts (District Gini) as an explanatory variable and subjective inequality variable (Perceived inequality index), which is constructed as a mean of values from three questions regarding people's inequality perceptions, as a dependent

variable.

The dataset from Willard and Cingl (apart from observations concerning religion and secularisation which are not relevant for this bachelor thesis) includes the individual's income bracket, region, and district of residence, individual difference measures on perceptions of equality and security in government institutions, and other relevant regressors. These variables will serve very well for testing the geographic reference group hypothesis in detail.

The empirical findings provide little support for the geographic reference group theory as all regressions showed a highly insignificant relationship between district inequality and perceived inequality. Thus, suggesting that respondents, who live in districts with high levels of income inequality relative to other districts do not necessarily perceive greater income inequality in overall. Controlling for regional differences (i.e. region fixed-effects), the results still imply an insignificant relationship between district inequality and people's overall inequality perceptions. The positive difference between inequality perceptions in the Czech Republic and Slovakia suggests that Czech people tend to perceive higher income inequality relative to Slovaks after controlling for the actual income inequality.

This bachelor thesis is organised as follows. Firstly, an overview of the existing literature is provided. In section 3 dataset is described, starting with the posing of the research questions, followed by a description of data population and the final sample size. In section 4, data analysis and empirical research are provided, and part 5 will conclude the main findings. At the end of this thesis, Appendix can be found.

2 Overview of existing literature

In this section, an overview of existing literature is provided, starting with the general economic theory of predictions, followed by findings and evidence regarding biases in perceptions of the income distribution, accompanied with several possible explanations of these misperceptions. Then ambiguities in the Meltzer and Richard hypothesis and link between perceived income inequality and redistribution are presented.

2.1 General economic theory of predictions

Economists typically build their models on two assumptions regarding how individuals form their economic perceptions - the perfect information assumption and the theory of rational expectations. In general, perfect information refers to a situation when each agent knows the other agent's utility function. The theory of rational expectations suggests that people have rational expectations about economic variables and they behave in ways that maximise their utility. Thus, when combining two assumptions, the interpretation is as follows. Owing to the perfect access to information, people make unbiased estimates of variables and based on these estimates, they choose an option that is most in line with their personal preferences.

For individuals to be able to form their judgments and beliefs about the distribution of income, they need to gather economic information about income inequality, poverty, and social mobility. If a situation with perfect availability of information is present, then the ability to process the relevant data is rather a trivial consideration as incomes of all members of the society are observed.

The level of income inequality can reveal useful information about the economy and the economic development of a given country and is considered to have a significant effect on redistributive policies. Nevertheless, the direction in which the political economy is going to aim in the future is somewhat troublesome.

Meltzer and Richard (1981) provide a seminal answer on this issue. The

Meltzer and Richard (MR) model claims that higher income inequality leads to a more extensive redistribution. The MR model is rather complicated, among other steps it contains the validity of the median voter hypothesis.

The median voter is an individual with the median level of income. Since the income in the society is not distributed evenly, typically slightly skewed to the right, the mean income will exceed the median income, thus, making the median voter relatively poorer. If the median voter is decisive and the net transfers are progressive, his gain increases through joint action of taxes and transfers, and therefore he will demand a higher degree of redistribution.

The MR model assumes that voter's preferences on redistribution are determined solely by his position on a scale of the income distribution. Thus, it implies that the median voter is fully informed as he concludes his position on the scale of the overall income distribution correctly and knows whether he would lose or gain from further redistribution.

The median voter hypothesis suggests additional critical remarks. The median voter must earn from the process of redistribution; the transfers received by the median voter must exceed the amount of taxes paid. Otherwise, he will choose zero optimal tax rate. The poorer in relative terms the median voter is, the more significant his gains are. Nevertheless, it does not imply that the median voter will necessarily gain more than others will (Milanovic, 2000).

Above all, the MR model shows how inequality (regarding mean-median distance) may promote higher income tax burden in equilibrium as decisive voter seeks for a larger gain from redistribution. Therefore, in more unequal societies, a higher level of redistribution should occur. However, the crucial assumption of the MR model that the median voter generally knows his position on the scale of income distribution may not be reasonable as the perfect availability of information is usually unattainable.

2.2 Inequality misperceptions

In general, the estimation of income distribution is regarded as a statistical inference problem as the limited access to information is present. Economic agents usually observe only a subsample of the population, and from that perceived sample they infer the whole income distribution. If they do not adequately take into account the selection process and do not apply the Bayes' rule¹, their conclusions are systematically biased.

To put it another way, individuals tend to misperceive the distribution of income in the presence of imperfect information. Misperceptions are defined as a bias which is explained as a deviation from the actual value. An over-estimation of the true value corresponds with a positive bias, and an under-estimation refers to a negative bias.

The primary motivation for the discussion of misperceptions of income distribution is that they can have a significant impact on policies with redistributive elements.

Gimpelson and Treismain (2018) have constructed a profoundly thorough study on how people misperceive their position on a scale of the income distribution. Researchers obtained information about perceived income inequality through a multinational questionnaire. One question showed respondents five diagrams of different types of societies. Respondents were then asked to pick the chart that best represented their country.

The results varied considerably across countries. Nevertheless, regardless of nationality, respondents were able to assign the proper diagram to the income distribution in their country correctly only slightly more often than by choosing the correct answer randomly. Surprisingly, the highest errors were made in countries where we would expect better-informed population.

Further, respondents were asked to pick a decile in which they believed they fall within the national income distribution. Gimpelson and Treismain (2018) also added questions about consumer durables, to be able to detect

¹Bayes' rule describes the probability of an event, based on prior knowledge of conditions that might be related to the event. The theorem expresses how a subjective degree of belief should rationally change to account for availability of related evidence.

people who belong almost certainly to the wealthiest group in the country and others who belong undoubtedly to the poorest in the country.

For instance, one question asked about the ownership of cars related to whether anyone in person's family owns a car. In developed countries, this information reveals almost nothing, since it is very usual to own a car in countries like the United States (US) or Sweden. On the other hand, in six surveyed countries national statistics reveal that less than one-third of households own a car. Thus, we can assume that people who own a car in these six countries belong in the top income deciles. The results indicated that more than a half of such respondents perceived themselves to earn less than the national median income.

Above all, results in the study of Gimpelson and Treisman (2018) have shown that people misperceive the income inequality and their position on the scale of the income distribution. Many people who indeed belonged to the highest decile placed themselves below the average on a range of income distribution, while people who certainly belonged to the lowest decile thought that their income is higher than the true value. Both groups believed that they are closer to the national median than they actually are. By contrast, Meltzer and Richard (1981) in their model demonstrated that the median voter is fully informed and knows whether he would lose or gain from redistribution.

The study of Cruces *et al.* (2013) has concluded similar substantial findings. Results confirmed that economic agents are unable to assess to which income group they belong. Low-income earners usually placed themselves in higher positions than they really were, whereas the high-income earners perceived themselves in lower than actual positions.

Further, Bublitz (2016) has observed that majority of participants from Brazil overestimated their rank in the income distribution. Conversely, Karadja *et al.* (2014) have provided evidence for people's underestimation of their relative position as a vast majority of Swedes believed that they are poorer than they actually are. Particularly, younger, poorer, and less

educated individuals misperceived their position to a large extent.

Osberg and Smeeding (2006) offer further support for evidence of misperceptions of income inequality as the highest income earners in the US are becoming less aware of a widening inequality gap and even the lowest income earners have become more reconciled with the situation.

Norton and Ariely (2011) pointed out similar results regarding wealth, namely that respondents underestimated the level of wealth inequality in the US. Further, respondents have chosen the desired allocation of wealth that was far more equitable than even their biased low estimates of the actual wealth distribution. The result that researchers found most remarkable was that preference for equal allocation of wealth in the US was robust across gender, political compass, and income. However, a newly conducted study by Chambers et al. (2014) has challenged the measurement implemented by Norton and Ariely and has shown that Americans tend to overestimate a rise of income inequality over time.

2.3 Possible explanations of misperceptions

The views and attitudes towards the distribution of income are inaccurate due to a diverse number of reasons. In this section, several possible explanations of biased perceptions of income are provided.

2.3.1 Reference group theory

One prominent explanation for the discrepancies between the perceived and actual income inequality is the reference group theory (Hyman, 1960). People usually make assumptions about income distributions based on their set of individual interactions with others, i.e. with their reference groups. Reference groups refer to relatively small groups such as family, co-workers, neighbourhoods, or regions where they live.

After inferring the levels of income from a fraction of the population, individuals deduce the income distribution for the entire population. Naturally, they know their level of income, but not necessarily their position on the

scale of the income distribution. If they do not adequately take into account the selection process and fail to apply the Bayes' rule, their conclusions can result in biased perceptions. The task to infer accurate assessment of income distribution is complex. Those individuals that have limited abilities to form expectations and properly process economic information are denoted as naïve agents (Thompson *et al.*, 1981; Wegener and Petty, 1995).

In the extreme situation, the naïve agent uses his findings from the sub-population as if they were representative of the whole population. If the agent's formation of sub-population does not depend on the income, then, every group would be a representation of the entire population.

Nevertheless, the selection of the representative group is probably affected by the income. High-income earners tend to meet with other high-income earners. Thus they infer estimates of income distribution from "rich" reference group and vice versa with the low-income earners. Since naïve agents with a rich reference group use their information about the income distribution as if it was a representation of the whole population, they tend to underestimate the actual cumulative income distribution. Hence, they underestimate their position in the overall distribution. On the other hand, naïve agents with a poor reference group tend to overestimate their income position in the society. Thus, they assume that they would not benefit from a further redistribution (even though they actually would).

Cruces *et al.* (2013) provide a specific answer for people's misperceptions of overall income distribution - the geographic reference group theory. The geographic reference group theory refers to a generalisation of the reference group based on the area of residence as if it represented the whole country. The wholly naïve agent will report his relative position within his local reference group as if it was his position in the cumulative income distribution. Further according to this theory, people who live in an area with high level of income inequality relative to other areas should perceive overall income inequality more critically.

On the other hand, for a "sophisticated" agent with an ability to form

rational expectations, relative income within a reference group should not have a further effect on the perceived position on a national scale of income distribution after controlling for other explanatory variables.

Nevertheless, Cruces *et al.* (2013) showed that respondents' income rank within their locality could explain a substantial variation in their perception of income distribution at the country level. The researchers observed an additional finding, namely that respondents with homogeneous social interactions are more inclinable to geographic reference group biases. It can be explained by the fact that people who have heterogeneous social interactions, i.e., people who interact with several distinct groups have more precise notion about the diversified scale of income distribution, and they are less likely to fail to consider the Bayes' rule.

Xu and Garand (2010) offer further support for the hypothesis that people project their local findings from the sub-population as if they were representative of the national population. The researchers observed that individual state income inequality has a positive and highly significant effect on perceptions of overall inequality in the United States. Individuals, who live in states with higher income inequality, are more prone to perceive accurately that the income gap in the United States has been widening over the past 20 years.

2.3.2 Media

Media coverage can also partly shape perceptions of inequality. Diermeier *et al.* (2017) find that greater coverage of inequality related news significantly prompts higher concerns about the general economic situation and fairness in Germany among the respondents. Although on the macro level less attention to the economic situation is correlated with higher media coverage, the paper provides evidence that media coverage is likely to form opinions at the individual level and thus to play an essential role in shaping individual inequality perceptions.

McCall (2005) offers further support for the media coverage hypothesis.

McCall suggests that the decrease in the percentage of people who perceived rising income inequality during 1996 to 2000 period may be due to a reduction in media coverage on income inequality stories nationwide during this period.

Lastly, Pop-Eleches (2009) proposes that expansion of mass media and western consumer society projected into TV series might cause people from poor post-communist countries to compare their consumption to the Western states, leading them to exaggerate the level of inequality within their country.

2.3.3 Psychological effects

Cruces *et al.* (2013) suggest that psychological effects may explain part of the variation in perceptions. Respondents from poorer backgrounds may not feel comfortable to state their level of income, and thus they exaggerate their accurate perceptions, vice-versa for the richer respondents.

Loughnan *et al.* (2011) propose that economic inequality is linked to self-enhancement biases. Self-enhancement phenomenon refers to a situation where individuals tend to visualise themselves at higher positions than they actually are. The results showed that people's inclination to believe they have more desirable characteristics than others appears to be widespread. In societies with less income inequality, people showed a relatively weak bias compared with people in relatively unequal societies.

Above all, there are many contributing factors to misperceptions. Geographic reference group hypothesis suggests people project local perceptions onto their estimates of overall income inequality. Media coverage hypothesis proposes that greater coverage of inequality related news spurs higher concerns about the distribution of income. Furthermore, individuals may tend to evaluate their positions in income distribution more favourably than they actually are.

All the mentioned theories might partly shape individual's perceptions. Nevertheless, the significant sources of biased perceptions of inequality have yet to be fully identified.

2.4 The link between inequality misperceptions and redistribution

Standard theory suggests that as the gap between median and mean income expands, the more considerable redistribution from rich to poor will occur (Meltzer and Richard, 1981). Nevertheless, when testing the MR hypothesis, some studies find a positive link between inequality and redistribution while others propose a negative relationship. Although the individual studies use different measures of income inequality (the ratio of mean to median, the Gini coefficient, etc.), they all assess their results based on the objective data about the income distribution, which may not coincide with people's inequality perceptions.

Engelhardt and Wagener (2014) suggest an explanation why the empirical tests of the MR hypothesis often appear to be inconclusive. For the MR hypothesis to display anticipated results, researchers propose rather than applying official data obtained from statistical office, using people's perceptions about income distribution.

Empirical results from the paper by Engelhardt and Wagener (2014) are as follows. Regressing various specifications on actual income inequality delivered a negative relationship between redistribution and inequality suggesting that lower inequality stimulates redistribution, on the contrary to what the MR hypothesis predicts. Nevertheless, regression of various specifications on perceived income inequality brought the desired results. The correlation between inequality and social expenditures proved to be positive, which is in line with the MR hypothesis.

Gimpelson and Treisman (2015) have also examined the economic inequality as a crucial tool for the political decision-making. The results indicated a very weak link between the actual income inequality and people's demand for redistribution, while a strong correlation was present between the perceived income inequality and the need for redistribution. This finding is consistent with the notion that not the actual shape of income distribution but the perceived shape of income distribution defines the political economy

models (Engelhardt and Wagener 2014).

Since an abundant number of studies² have concluded that people misperceive their position on a scale of the income distribution, the two following studies have focused on whether the process of translating perceived inequality into demand for redistributive policies might differ when respondents are informed about their actual position in the income distribution.

Cruces *et al.* (2013) pointed out the contradictions between the subjective assessment of agent's position and the actual position to a randomly assigned treatment group. Confronting the agents with accurate information had a significant effect on their stated attitudes towards redistribution. Those agents, who underestimated their position on the scale of income distribution, did not change their preferences for redistribution, while those, who underestimated their relative position and learnt they are worse off after receiving accurate information, demanded more redistribution than those in the control group.

Karadja *et al.* (2014) provide an insightful extension to the Cruces *et al.* (2013) study. Researchers also conducted an experiment by informing a random subsample about their exact relative income position and further they examined whether the relationship between perceived inequality and demand for redistribution differs across groups. Respondents who learnt that they are actually in a better place than they thought, demanded less redistribution. This effect was predominantly driven by a subgroup with right-of-centre political preferences, while respondents with left-of-centre preferences did not respond to the new information.

Further, different beliefs about the sources of inequality can affect to a large extent what kind of redistributive policy will be implemented. Alesina and Angeletos (2005) focused on the cross-country differences in attitudes towards redistribution. Specifically, the paper showed that the United States (US) choose a lower degree of redistribution than Europe as many more Americans than Europeans consider that market outcomes are fair and the

²Osberg and Smeeding (2006); Norton and Ariely (2011); Engelhardt and Wagener (2014); Kuhn (2015); Hauser and Norton (2017); Gimpelson and Treisman (2018).

individual effort shapes the income. In Europe, however, they demand a higher level of redistribution, since the majority of society believes that income is mainly determined by luck.

The demand for more redistribution and government intervention causes distortions in market allocations. The market distortions increase the importance of a perception of the effect of luck and make the economic outcomes unfair. Consequently, the market distortions justify the European attitude towards redistribution. The opposite state occurs in the US, where lesser market distortions are associated with fairer income distribution and hence with lower demand for redistribution.

Above all, Alesina and Angeletos (2005) showed the interconnectedness of political and economic choices, and when the fairness of redistribution is present, it can lead to multiple long-run equilibria. Differences in attitudes towards income redistribution may be associated with a different historical background in the US and the continental European countries. In Europe, class differences are deeply rooted, and wealth is linked with privilege, and thus there is a higher demand for reallocation of income while in the US, as a land of opportunities, the success is related to effort and hard work.

In conclusion, standard MR model suggests that higher income inequality (regarding mean-median distance) in the country leads to a more extensive redistribution. The theory stands on the assumption that individuals are fully informed as the median voter generally knows his relative position and whether he would lose or gain from further redistribution. Nevertheless, the perfect availability of information might be unattainable as various studies have concluded that individuals hold erroneous beliefs about their position on the scale of the income distribution.

There are many contributing factors to misperceptions. One prominent explanation of misperceptions is the geographic reference group hypothesis, which suggests that people rely too heavily on local incentives, resulting in their biased views of the overall income distribution. Nevertheless, all sources of biased perceptions of inequality have yet to be fully identified.

Researchers offer an explanation why the empirical tests of the MR hypothesis often appear to be inconclusive by proposing that not the actual shape of income distribution but the perceived shape of income distribution drives preferences for redistribution. The results support the proposed view as there is a strong and positive relationship between the perceived income inequality and the demand for redistribution.

Lastly, people build their redistributive preferences on their perceptions of inequality, which are often inaccurate. Cruces *et al.* (2013) and Karadja *et al.* (2014) have concluded that after correcting the misperceptions, the process of translating perceived inequality into demand for redistributive policies shifts.

3 Data and descriptive statistics

3.1 Research questions

The distribution of income can reveal useful information about the economy and the economic development of a given country as it is one of the most important indicators of the well-being of its citizens. Furthermore, the direction in which the redistributive policies are going to aim in the future is primarily influenced by the level of actual income inequality. Nevertheless, the level of redistribution might not be in line with individuals' preferences as many studies³ have concluded that there is a distortion between the objective and perceived income distribution. Objective inequality refers to data analysis received from the official statistical office, while perceived inequality refers to how people observe their position on a scale of income distribution and the general income inequality.

Many theories try to explain these possible perception biases. Geographic reference group theory is one of them and claims that people rely too heavily on incentives from their local environment, and thus leading them to have erroneous beliefs about the overall distributions of income. When individuals infer their perceptions, they often compare themselves to others, i.e., with their reference group. Reference groups refer to relatively small groups (consisting of family members, friends, or co-workers) usually formed in the area where the individuals live. Therefore, when the local scale rather than national scale is taken into account, individuals may have more precise notions about the distribution of income. Thus, the principal research question relates to whether the local inequality measure as an explanatory variable has *ceteris paribus* effect on discrepancies in people's perceptions.

Q1: Does perceived income inequality relate better to observed regional inequality?

Owing to the availability of dataset with Czech and Slovak respondents, we can compare perception disparities in these two countries. The second

³Osberg and Smeeding (2006); Norton and Ariely (2011); Engelhardt and Wagener (2014); Kuhn (2015); Hauser and Norton (2017); Gimpelson and Treisman (2015).

research question is as follows.

Q2: How do perceptions of inequality differ in the Czech Republic and Slovakia?

3.2 Dataset

The core data is obtained from SILC dataset and the recent research on secularisation and religious belief in the Czech Republic and Slovakia conducted by Willard and Cingl (2017). The original dataset contained 2022 observations for every 254 variables. Nevertheless, after discarding all missing values of dependent variables, the subset comprises 1988 observations.

Willard and Cingl (2017) tested religiosity theories with a representative sample collected in the Czech Republic and Slovakia. Representativeness corresponded to age, gender, income, and region in both countries. The complete dataset includes many variables concerning religion and secularisation, which are not relevant for this bachelor thesis. Nevertheless, the dataset also consists of household's income bracket, region, and district of residence, individual difference measures on perceptions of income equality and trust in government institutions. Furthermore, it includes additional regressors containing personal and household characteristics to proxy for the respondent's income-generating capacity (education level, age, gender). Gini coefficients with respect to countries' districts are calculated from SILC dataset. These variables will serve very well for testing the given hypothesis.

3.2.1 Description of variables

The variable of interest is constructed as a mean of values from three questions regarding subjective perceptions of income inequality. The respondents were asked to pick a number on the scale from 1 to 7 to each question based on their beliefs. The number 1 corresponds to the answer of strongly disagree, followed by number 2 - disagree, number 3 - somewhat disagree, number 4 - neither agree or disagree, number 5 - somewhat agree, number 6 - agree, and number 7 - strongly agree.

The questions are worded as follows. The first question relates to social mobility: *"Do you think that is probable, that people who start as poor are likely to get rich when they work hard enough?"*. The higher the number a respondent selected in the first question, the more he assumes that market outcomes are fair and the individual effort shapes the income. On the other hand, when the respondent picked a low number, he believes that income is mainly determined by luck.

The second question regards to a justice of the system: *"How do you think it is likely that most rich people have acquired their property by illegal methods?"*. In this question, the higher the number a respondent selected, the more he believes that system is unjust, while when he chose a low number, he thinks that society is fair.

The last, most crucial question regards to the issue of interest - income inequality: *"To what extent do you think that the difference between the poor and the rich is too high?"*. This question relates to whether a respondent thinks that the gap between rich and poor keeps widening. The higher the number he picks, the more he agrees with the statement and vice versa.

As the first question has reverse scaling compared to the other two questions, we rescale it to be able to construct a new variable - Perceived inequality index. Perceived inequality index refers to the mean of values from three questions mentioned above, and its interpretation is thus following: the higher the value of Perceived inequality index, the more critically a respondent tends to perceive the income inequality in the Czech Republic and Slovakia, respectively. Both Perceived inequality index and the values from the individual questions concerning the inequality, as an alternative specification, will be examined in this bachelor thesis.

To analyse the relationship between the perceived inequality in a society and the actual income inequality, we use the Gini coefficient. Specifically, we work with the Gini coefficient with respect to country's districts (District Gini), which was calculated from the SILC dataset. Gini coefficient measures the magnitude to which the distribution of income among individuals

diverges from a perfectly balanced distribution. The Gini coefficient ranges from 0 to 1. The lower the value of Gini coefficient is, the more fair income distribution in the society is (i.e. everyone has a similar level of income). Whereas higher Gini coefficient is associated with unequal income distribution, i.e., one person has nearly all the income, while everyone else has hardly any income. For instance, 0 corresponds to the perfect equality and 1 represents perfect inequality.⁴

It is also worth emphasising at this point, that dataset contains two kinds of Gini coefficients - Gini brutto and Gini netto. The principal difference in coefficients is whether their calculation is based on individual income or wage. Income is best defined as the sum of salary before the deduction of tax and insurance, while wage is a net amount paid to an employee after tax and other sorts of deductions are made (i.e. disposable income). In this bachelor thesis, we work with Gini brutto as the primary focus is given to the income inequality before taxation. Partly because the World Values Survey in their questionnaires typically asks about income before taxation, and thus respondents may rather think of income before taxes and transfers when judging income differences. Nevertheless, when using the Gini netto instead, the results are qualitatively similar (See Appendix C).

⁴To be able to compare the results from the Czech Republic and Slovakia, the Gini coefficients were standardised. Standardisation refers to rescaling of a variable in order to have a mean of zero and standard deviation equal to 1. The advantage of the Gini coefficient is that it is invariant with respect to scale, so larger districts do not necessarily have larger Gini coefficients. Owing to the availability of district Gini's, we are able to test the hypothesis related to whether people base their inequality perceptions on regional disparities.

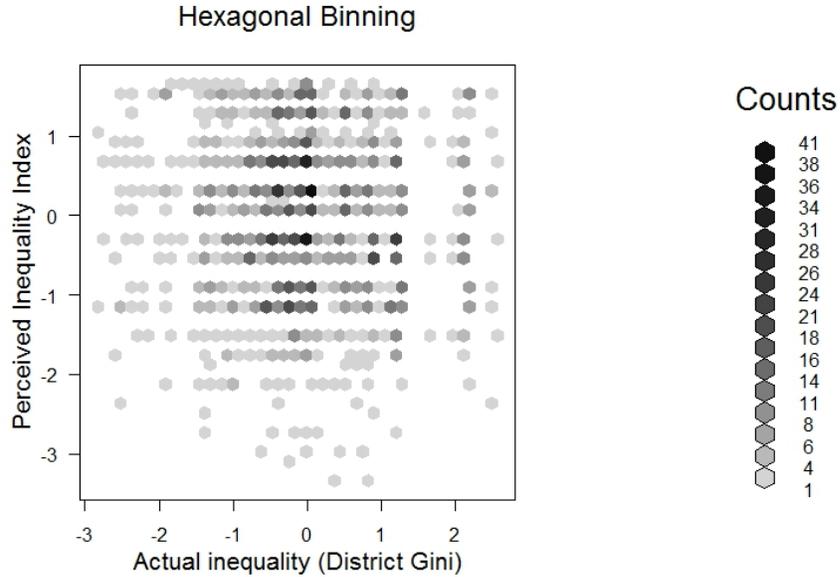


Figure 1: Perceived inequality index and District Gini

We take a first glance at the relationship between Perceived Inequality Index and District Gini (brutto) by plotting these two variables against each other. The chart (Figure 1) does not show any specific pattern so that it might imply a weak relationship between perceived and actual inequality.

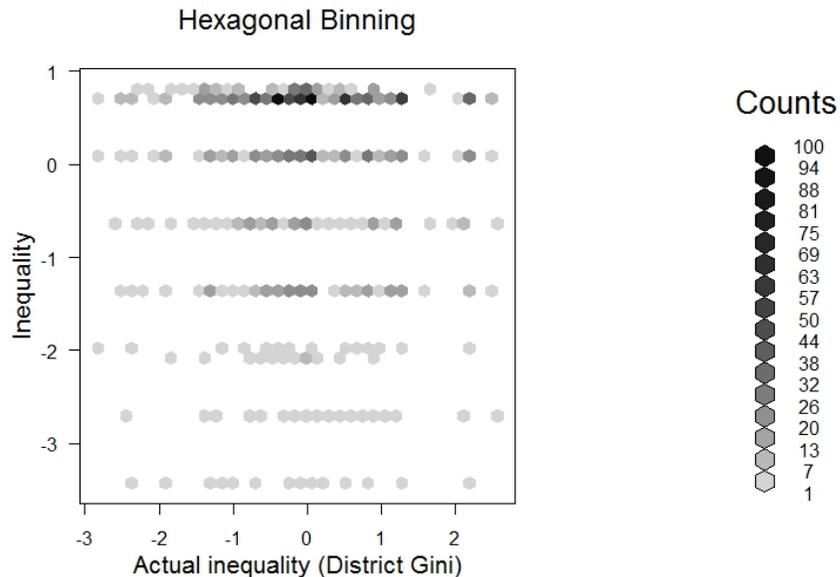


Figure 2: Inequality and District Gini

Again, by plotting the sole question of inequality against the District Gini, we briefly examine their relationship. The chart (Figure 2) does not

show any specific pattern of linear relationship. Nevertheless, we can see that for any value of District Gini, the highest values for inequality question are chosen most often.

Furthermore, a substantial part of respondents strongly agrees that the gap between the rich and poor is vast (51.4 percent) or agrees (19.7 percent); hence a total of 71.1 percent of respondents perceive that income inequality is too high. On the other hand, only 3.3 respondents disagree or strongly disagree with the statement that the gap between rich and poor is too wide. The remaining 25.6 percent of respondents somewhat agree or somewhat disagree with the statement.

According to OECD (2018), both countries the Czech Republic and Slovakia have comparably lower Gini coefficients than the rest of Europe, and still, Czech and Slovak people tend to view the income differences extremely critical. One of the possible reasons is the socialist background in both countries, which causes people to perceive already small income differences much more critical than other countries.

4 Empirical analysis

In this section, we provide an empirical analysis of the data.

4.1 Basic model

Owing to the availability of district Gini coefficients, the basic model explores whether or not the regional disparities play a role in determining how people form their perceptions about the overall income inequality. In the basic model, we regress *Perceived inequality index*,⁵ a dependent variable, on two independent variables, namely *District Gini (brutto)*⁶ and a dummy variable *Czech* to control for differences between the Czech Republic and Slovakia in the dataset. The estimated basic model is thus the following:

$$\text{Perceived inequality index} = \beta_0 + \beta_1 \cdot \text{Czech} + \beta_2 \cdot \text{District Gini} + u$$

The results of the estimation (Table 1, Column 1) indicate a slightly negative relationship between district inequality and perceived income inequality. The difference between inequality perceptions in the Czech Republic and Slovakia is measured by the dummy *Czech*. The positive coefficient indicates that Czech people tend to perceive higher income inequality relative to Slovaks after it has been controlled for the district income inequality. It is worth emphasising at this point, both independent variables are not significant at all conventional levels. Thus, the results do not suggest that individuals who live in districts with high levels of income inequality relative to other districts will tend to perceive income inequality more critically. Moreover, results from the model appear to imply that inequality perceptions are almost uncorrelated with district inequality.

Compared to results of former studies, Xu and Garand (2010) have found a positive and significant link between objective and perceived inequality when regressing respondents perceptions of inequality in the United States

⁵Throughout this paper, the term Perceived inequality index will refer to the mean of values from the three questions on the income inequality.

⁶As it was mentioned before, the Gini coefficients were standardised in order to compare the results from the Czech Republic and Slovakia.

on levels of income inequality in individuals' home states (state-level Gini). Cruces et al. (2013) have also concluded that locality can explain a considerable part of the variation in respondents' perceptions of the cumulative income distribution.

Thus, our results vary significantly from previous studies. We can speculate that this might be due to a different specification of subjective inequality variable, use of Gini in respect of districts instead of national Gini or due to the poor performance of our index as a measure of perceived inequality.

We subject the analysis to a variety of tests of OLS assumptions. Residuals from the basic model appear to be homoskedastic (Breuch-Pagan, p-value = 0.8408). The detailed description of assumption testing can be found in Appendix B.

4.2 The set of models with Perceived inequality index as the dependent variable

To illustrate the relationship between respondents' perceptions about overall income inequality and district income inequality, Table 1 presents series of regressions where Perceived inequality index is the dependent variable. Column 1 shows a simple regression examined earlier with only two independent variables.

Column 2 represents a regression where household's income bracket and personal characteristics, i.e. education level, age, and gender are added as independent variables. The results of the estimation in Column 2 again indicate a slightly negative relationship between actual and perceived income inequality. However, both independent variables *District Gini* and a dummy *Czech* still stay insignificant.

Columns 3 and 4 represent regressions where self-reported variables are added as independent variables. The results of the estimations bring similar results as in the previous models.

Explanatory variable *Age* is highly significant in every model. Models show a positive relationship between variables *Age* and *Perceived inequality*

Table 1: The set of models with Perceived inequality index as the dependent variable

| | <i>Dependent variable:</i> | | | |
|------------------------|----------------------------|----------------------|----------------------|----------------------|
| | Perceived inequality index | | | |
| | (1) | (2) | (3) | (4) |
| Czech | 0.029 (0.048) | -0.006 (0.048) | 0.028 (0.047) | 0.012 (0.044) |
| District Gini (brutto) | -0.026 (0.024) | -0.018 (0.024) | -0.011 (0.023) | -0.017 (0.021) |
| HH's income | | -0.042* (0.023) | -0.011 (0.024) | -0.008 (0.023) |
| Female | | -0.021 (0.044) | -0.061 (0.042) | -0.085** (0.040) |
| Age | | 0.015*** (0.002) | 0.015*** (0.002) | 0.017*** (0.002) |
| Education | | -0.036*** (0.010) | -0.015 (0.010) | -0.015 (0.010) |
| Financial insecurity | | | 0.292*** (0.023) | 0.246*** (0.022) |
| Social insecurity | | | | -0.238*** (0.022) |
| Government | | | | -0.126*** (0.023) |
| Constant | -0.013 (0.033) | -0.390*** (0.098) | -0.508*** (0.098) | -0.567*** (0.092) |
| Region fixed-effects | No | No | No | No |
| Observations | 1,988 | 1,988 | 1,986 | 1,975 |
| R ² | 0.001 | 0.051 | 0.131 | 0.223 |

Note:

*p<0.1; **p<0.05; ***p<0.01

index, as older individuals in the sample tend to perceive higher income inequality. The opposite state occurs in the case of *Education*, i.e. more educated people from the sample tend to perceive lower income inequality. More educated individuals might be more tolerant to higher inequality than the less educated individuals, possibly because they think about prospects of upward mobility resulting from higher education (Alesina and Giuliano, 2009). However, the variable *Education* is statistically significant only in the second model.

Variable *Household's income* is a categorical variable and represents household's income bracket. It displays a mildly negative relationship with the dependent variable as high-income earners tend to be less concerned with the level of income inequality compared to low-income earners. However, *Household's income* is statistically significant only in the second model.

Dummy variable *Female* controls for differences in inequality beliefs between men and women. The negative and significant coefficient in the fourth model (Column 4) suggests that women are more tolerant to income inequality relative to men.

Financial insecurity variable is based on a mean of values from four questions related to participant's fears of not having enough money or becoming destitute. It displays positive and highly significant relationship with the dependent variable, as individuals that are more financially insecure tend to perceive higher income inequality. Nevertheless, it is worth emphasising that both *Financial insecurity* and *Perceived inequality index* are self-reported variables, thus, both are endogenous. Their relationship must be interpreted with sufficient care as endogeneity of explanatory variables may cause bias in their coefficients.

The coefficient of *Government* variable suggests a negative and highly significant relationship with perceived income inequality. Nevertheless, *Government* is a self-reported variable (as is the dependent variable), and thus we would anticipate a certain degree of correlation between these variables. The findings indicate that stronger social protection measures tend to be

associated with more positive perceptions of government institutions. The results are in line with findings that there is a negative link between generalised trust in institutions and perceived income inequality (Stephany, 2015).

We find similar findings with *Social insecurity* variable, which relates to the individual’s fears about social services, such as welfare and healthcare failing. As it has reverse scaling as *Perceived inequality index*, the interpretation is thus following: individuals, who fear that state welfare support will not suffice in case of job loss or illness, tend to perceive higher income inequality.

In conclusion, all regressions show a highly insignificant relationship between *District Gini* variable and *Perceived inequality index*, suggesting that respondents, who live in districts with high levels of income inequality relative to other districts, do not necessarily perceive income inequality more critically. The results even indicate a slightly negative (but still insignificant) link. The positive difference between inequality perceptions in the Czech Republic and Slovakia measured the by the dummy *Czech* suggests that Czech people tend to perceive higher income inequality relative to Slovaks after the actual income inequality has been controlled for. However, it is worth emphasising that a dummy *Czech* is insignificant at all conventional levels in every regression.

We perform a variety of robustness checks and other tests for OLS assumptions, none of which qualitatively affects our general conclusion. In the models, where heteroskedasticity was detected, we used robust standard errors. Further discussion can be found in Appendix B and C.

4.3 Second basic model

To analyse the desired relationship in depth, we apply an alternative specification of the model. In the second basic model, we regress the sole question of inequality - *Inequality* on *District Gini (brutto)* and a dummy variable *Czech*. The estimated basic model is thus the following:

$$Inequality = \beta_0 + \beta_1 \cdot Czech + \beta_2 \cdot District\ Gini + u$$

The results of the estimation (Table 2, Column 1) indicate a slightly negative relationship between district inequality and people’s overall inequality perceptions. Nevertheless, the independent Gini variable is insignificant at all standard levels, implying that individuals who live in districts with high levels of income inequality relative to other districts do not necessarily perceive greater income inequality in overall.

The positive coefficient of dummy *Czech* suggests that Czech people tend to observe higher income inequality relative to Slovaks after we have controlled for the district income inequality. Although the dummy *Czech* has still relatively high p-value of 0.103, the significance of the variable has substantially risen compared the first model with *Perceived inequality index* as a dependent variable.

Compared to results of former studies, Xu and Garand (2010) have concluded a positive relationship between individual state income inequality and respondents’ perceptions of overall income inequality in the United States. Cruces *et al.* (2013) have also found a positive and highly statistically significant relationship between locality measure and overall perceived inequality. Thus, our results again vary considerably from previous studies.

We check the model’s assumptions for potential problems. Residuals from the basic model appear to be homoskedastic (Breuch-Pagan, p-value = 0.2102). The detailed description of assumption testing can be found in Appendix B.

4.4 The set of models with Inequality as a dependent variable

To examine the relationship between overall perceived inequality and objective district inequality thoroughly, Table 2 presents series of regressions where the *Inequality* variable is the dependent variable. Column 1 shows a simple regression examined earlier with only two independent variables.

No substantial changes are present in Columns 3 and 4 compared to the model in Column 2. The examined relationship between perceptions of overall income inequality and district inequality remains to be slightly negative.

Table 2: The set of models with Inequality as a dependent variable

| | <i>Dependent variable:</i> | | | |
|------------------------|----------------------------|----------------------|----------------------|----------------------|
| | Inequality | | | |
| | (1) | (2) | (3) | (4) |
| Czech | 0.079 (0.048) | 0.080 (0.050) | 0.112** (0.049) | 0.100** (0.048) |
| District Gini (brutto) | -0.026 (0.024) | -0.023 (0.025) | -0.016 (0.024) | -0.019 (0.024) |
| HH's income | | -0.071*** (0.026) | -0.042* (0.025) | -0.039 (0.025) |
| Female | | 0.050 (0.045) | 0.014 (0.043) | 0.0005 (0.043) |
| Age | | 0.010*** (0.002) | 0.009*** (0.002) | 0.010*** (0.002) |
| Education | | 0.012 (0.010) | 0.031*** (0.010) | 0.031*** (0.010) |
| Financial insecurity | | | 0.270*** (0.024) | 0.242*** (0.025) |
| Social insecurity | | | | -0.147*** (0.025) |
| Government | | | | -0.074*** (0.024) |
| Constant | -0.039 (0.033) | -0.487*** (0.106) | -0.596*** (0.106) | -0.629*** (0.104) |
| Region fixed-effects | No | No | No | No |
| Observations | 1,988 | 1,988 | 1,986 | 1,975 |
| R ² | 0.003 | 0.028 | 0.096 | 0.130 |

Note:

*p<0.1; **p<0.05; ***p<0.01

The positive coefficient of dummy *Czech* suggests that Czech people perceive higher income inequality relative to Slovaks after the district income inequality has been controlled for. Compared to the previous models, *Czech* is now significant at 5% level of significance; nevertheless, *District Gini* variable remains insignificant at all conventional levels.

Explanatory variable *Age* is highly significant in every model. The model indicates a positive relationship between the variable *Age* and perceived inequality, as older individuals in the sample tend to perceive higher income inequality. Compared to the models in Table 1, *Education* now displays a positive and highly significant link with *Inequality*. Thus, more educated people from the sample tend to perceive higher income inequality, on the contrary to the results from regressions in Table 1.

Variable *Household's income* displays negative relationship with the dependent variable, as low-income earners tend to perceive income inequality more distinctly compared to high-income earners. However, *Household's income* is not anymore statistically significant in the fourth model (Column 4).

Financial insecurity variable displays a positive and highly significant relationship with the dependent variable, as more financially insecure individuals tend to perceive higher income inequality.

Similarly, as in model 4, Table 1, the coefficients of *Government* and *Social insecurity* variables indicate a negative and highly significant relationship with perceived income inequality as stronger social protection measures tend to be associated with more favourable perceptions on government institutions.

To sum it up, all regressions remain to show the insignificant negative relationship between *District Gini* variable and perceived income inequality, implying that individuals who reside in more unequal districts do not observe a higher income inequality relative to individuals from more equal districts. The positive coefficient of dummy *Czech* suggests that Czechs tend to perceive higher income inequality relative to Slovaks after the district income inequality has been accounted for. It is worth emphasising that when other

variables are added to a regression, the dummy *Czech* becomes highly significant.

We subject our analysis to a variety of robustness checks and other tests for OLS assumptions, none of which qualitatively affects our general conclusion. In the models, where heteroskedasticity was detected, we used robust standard errors. Details can be found in Appendix B and C.

4.5 Adding NUTS 3 regions as explanatory variables

To analyse the effect of regions on individual’s perceptions about income inequality in detail, in this section, we add to the regression respondent’s region of residence, i.e. NUTS 3⁷ in the context of the EU’s standard for referencing the territorial units.

Table 3 presents series of regressions where region-fixed effects are included. The first model (Column 1) explores whether the district inequality measure plays a role in determining how people form their perceptions about income inequality after controlling for regional fixed-effects⁸. The model repeats the same regression as the basic model in the section 4.1, i.e. regression of *Perceived inequality index* on *District Gini (brutto)*. However, instead of dummy *Czech*, it includes 21 region fixed-effects to distinguish NUTS 3 regions in the Czech Republic and 8 regions in Slovakia. There are 14 regions in the Czech Republic and 8 regions in Slovakia. We drop region of *Prague* from the regression to avoid the dummy variable trap.

The results of the estimation indicate slightly positive and insignificant relationship between district inequality and perceptions of overall income inequality.

The coefficients of *Moravian-Silesian* region and *South Moravian* region⁹ are positive and significant, suggesting that people from these regions tend to

⁷The NUTS classification (Nomenclature of territorial units for statistics) is a administrative division of the economic territory in the EU. NUTS 1 relates to the major socio-economic regions. NUTS 2 relates to the basic regions for the application of regional policies. NUTS 3 relates to the small regions (Eurostat, 2018)

⁸NUTS 3 are larger regions than the regions to which District Gini coefficients are calculated.

⁹The list of all regions can be found in Appendix A.

perceive a higher level of income inequality relative to *Prague* region and the variable *District Gini* cannot explain these significant regional differences.

When other explanatory variables are added to regression, the results are as follows. The relationship between *District Gini* and *Perceived inequality index* continues to be insignificant.

Explanatory variable *Age* is highly significant in every model. The models indicate a positive relationship between variable *Age* and perceived inequality, as older individuals in the sample tend to perceive higher income inequality.

Similarly as in previous models, *Financial insecurity* variable displays positive and highly significant relationship with the dependent variable. Further, the coefficients of *Government* and *Social insecurity* variables indicate a negative and highly significant relationship with perceived income inequality. Variables *Household's income* and *Education*, display negative relationship with the dependent variable and their coefficients are significant only in the second model.

To sum it up, the results suggest that there might be differences across regions that are not explained by district Gini coefficients. These differences can partly shape the perceptions about the overall income inequality in the Czech Republic and Slovakia. The results indicate that after the district inequality has been controlled for, people from *Moravian-Silesian* and *South Moravian* regions tend to perceive a higher income inequality compared to people from *Prague*. Nevertheless, after we have accounted for these regional differences, the results still imply an insignificant relationship between district inequality and people's overall inequality perceptions. Thus, suggesting that individuals who live in districts with high levels of income inequality relative to other districts do not necessarily perceive greater income inequality in overall.

Table 3: The set of models with region-fixed effects

| | <i>Dependent variable:</i> | | | |
|------------------------|----------------------------|----------------------|----------------------|----------------------|
| | Perceived Inequality Index | | | |
| | (1) | (2) | (3) | (4) |
| District Gini (brutto) | 0.003 (0.035) | 0.001 (0.034) | 0.001 (0.033) | -0.015 (0.030) |
| HH's income | | -0.043* (0.023) | -0.011 (0.022) | -0.006 (0.023) |
| Female | | -0.019 (0.044) | -0.060 (0.042) | -0.084** (0.040) |
| Age | | 0.015*** (0.002) | 0.015*** (0.002) | 0.017*** (0.002) |
| Education | | -0.035*** (0.010) | -0.015 (0.010) | -0.015 (0.010) |
| Financial insecurity | | | 0.291*** (0.022) | 0.245*** (0.022) |
| Social insecurity | | | | -0.237*** (0.023) |
| Government | | | | -0.127*** (0.023) |
| Constant | -0.116 (0.102) | -0.487*** (0.134) | -0.558*** (0.128) | -0.575*** (0.121) |
| Region fixed-effects | Yes | Yes | Yes | Yes |
| Observations | 1,988 | 1,988 | 1,986 | 1,975 |
| R ² | 0.008 | 0.056 | 0.135 | 0.227 |

Note:

*p<0.1; **p<0.05; ***p<0.01

5 Conclusion

The principal purpose of this bachelor thesis has been to fill in the gap in the literature by analysing the current situation of distortions between the objective and perceived income distribution in the Czech Republic. The bachelor thesis has focused on one of the possible theories that attempt to explain the inequality perception biases - geographic reference group theory. Geographic reference group theory claims that people rely too heavily on incentives from their local environment, and thus leading them to have erroneous beliefs about the overall distributions of income. Therefore, individuals' perceptions may relate better to regional inequality rather than inequality on the national level. We tested this hypothesis by using District Gini as a regional measure of inequality.

We have found little evidence that respondents, who live in districts with high levels of income inequality relative to other districts perceive overall income inequality more critically, as all regressions showed a highly insignificant relationship between district inequality and perceived inequality. The positive difference between inequality perceptions in the Czech Republic and Slovakia suggests that Czech people tend to perceive higher income inequality relative to Slovaks after controlling for the actual income inequality.

After we have accounted for regional differences (i.e. region fixed-effects), the results still imply an insignificant relationship between district inequality and people's overall inequality perceptions. These findings suggest that in general, signals in the environment do not prompt respondents' sensitivity to income inequality and do not magnify their perceptions that inequality exists.

By contrast, among other studies, Xu and Garand (2010) have found a positive and significant relationship between state income inequality and respondents' perceptions of overall income inequality in the United States. Thus, implying that people residing in more unequal states relative to other states are more likely to perceive a rising overall income inequality in the

United States.

Therefore, our results vary significantly from previous studies. We can speculate that this might be due to a different specification of subjective inequality variable, use of Gini in respect of districts instead of national Gini or due to the poor performance of our index as a measure of perceived inequality.

Being limited to Perceived inequality index as a perceptions variable, this study lacks the analysis of how much people typically misperceive the cumulative income inequality in the Czech Republic. We did not examine the extent to what the perceived income inequality is shaped by the actual inequality in the Czech Republic. Thus, it was not possible to make a comparison between the discrepancies on the local scale and discrepancies on the national level, which could provide a more comprehensive picture on the issue.

For the political economy, it is crucial to understand how individuals translate objective income conditions into their perceptions of those conditions as not the actual shape of income distribution but rather the perceived shape of income distribution defines the political economy models (Engelhardt and Wagener 2014). The findings in this thesis indicate that the relative level of income inequality in respondents' district of residence did not shape their perceptions of inequality at the country level. To put it another way, respondents did not generalise their reference groups based on the area of residence as if they represented the whole country. Thus, the further research should consider other possible effects that can form people's inequality perceptions.

For instance, it is likely that the higher media coverage of inequality related news significantly prompts higher concerns about the general economic situation (Diermeier *et al.*, 2017). Furthermore, psychological effects may explain part of the variation in perceptions. Loughnan *et al.* (2011) propose that economic inequality is linked to self-enhancement biases, where individuals tend to visualise themselves at higher positions than they actu-

ally are. These factors might contribute to shaping individual's perceptions. Nevertheless, all sources of biased perceptions of inequality have yet to be fully identified. It would be a fruitful area for further research.

Considerably more work will need to be done to determine whether individuals build their perceptions on inaccurate information or whether factual information is misperceived. Given the impact of the people's inequality beliefs on policies with redistributive elements, a key government priority should, therefore, be to plan how to inform the general public about overall income distribution accurately. It would ensure that the redistribution policies are in line with individuals' preferences.

References

- [1] ALESINA, A., AND ANGELETOS, G.-M. Fairness and Redistribution. *American Economic Review* 95, 4 (September 2005), 960–980.
- [2] ALESINA, A., AND GIULIANO, P. Preferences for Redistribution. NBER Working Papers 14825, National Bureau of Economic Research, Inc, 2009.
- [3] BUBLITZ, E. Perceptions of Inequality Survey 2015/2016. *Global Economic Dynamics Study. Gütersloh, Germany: Bertelsmann Stiftung* (2016).
- [4] BUBLITZ, E. Misperceptions of income distributions: Cross-country evidence from a randomized survey experiment. Tech. rep., LIS Working Paper Series, 2017.
- [5] CHAMBERS, J. R., SWAN, L. K., AND HEESACKER, M. Better off than we know: Distorted perceptions of incomes and income inequality in America. *Psychological science* 25, 2 (2014), 613–618.
- [6] CRUCES, G., PEREZ-TRUGLIA, R., AND TETAZ, M. Biased perceptions of income distribution and preferences for redistribution: Evidence from a survey experiment. *Journal of Public Economics* 98 (2013), 100 – 112.
- [7] DIERMEIER, M., GOECKE, H., NIEHUES, J., AND THOMAS, T. *Impact of inequality-related media coverage on the concerns of the citizens*. No. 258. DICE Discussion Paper, 2017.
- [8] ENGELHARDT, C., AND WAGENER, A. Biased Perceptions of Income Inequality and Redistribution. Hannover economic papers (hep), Leibniz Universität Hannover, Wirtschaftswissenschaftliche Fakultät, 2014.
- [9] EUROSTAT. NUTS - Nomenclature of territorial units for statistics. URL: <http://ec.europa.eu/eurostat/web/nuts/background> (2018). [Online; accessed 2-May-2018].

- [10] GIMPELSON, V., AND TREISMAN, D. Misperceiving inequality. *Economics & Politics* 30, 1 (2018), 27–54.
- [11] HAUSER, O. P., AND NORTON, M. I. (Mis)perceptions of inequality. *Current opinion in psychology* 18 (2017), 21–25.
- [12] HYMAN, H. H. Reflections on reference groups. *Public Opinion Quarterly* 24, 3 (1960), 383–396.
- [13] KARADJA, M., MOLLERSTROM, J., AND SEIM, D. Richer (and holier) than thou? The effect of relative income improvements on demand for redistribution. *Review of Economics and Statistics* 99, 2 (2017), 201–212.
- [14] KUHN, A. The Individual Perception of Wage Inequality: A Measurement Framework and Some Empirical Evidence. *IZA Discussion Paper No. 9579* (2015).
- [15] LOUGHNAN, S., KUPPENS, P., ALLIK, J., BALAZS, K., DE LEMUS, S., DUMONT, K., GARGUREVICH, R., HIDEKGUTI, I., LEIDNER, B., MATOS, L., ET AL. Economic inequality is linked to biased self-perception. *Psychological science* 22, 10 (2011), 1254–1258.
- [16] MCCALL, L. Do they know and do they care? Americans’ awareness of rising inequality. *Work. Pap., Russell Sage Found* (2005).
- [17] MELTZER, A. H., AND RICHARD, S. F. A Rational Theory of the Size of Government. *Journal of Political Economy* 89, 5 (1981), 914–927.
- [18] MILANOVIC, B. The median-voter hypothesis, income inequality, and income redistribution: an empirical test with the required data. *European Journal of Political Economy* 16, 3 (2000), 367 – 410.
- [19] NORTON, M. I., AND ARIELY, D. Building a better America-One wealth quintile at a time. *Perspectives on psychological science* 6, 1 (2011), 9–12.

- [20] OECD. Income inequality (indicator). *URL: <https://data.oecd.org/inequality/income-inequality.htm>* (2018). [Online; accessed 2-May-2018].
- [21] OSBERG, L., AND SMEEDING, T. "Fair" inequality? Attitudes toward pay differentials: the United States in comparative perspective. *American sociological review* 71, 3 (2006), 450–473.
- [22] POP-ELECHES, G. Economic reference group salience in post-communist Eastern Europe: Causes and consequences. *URL: [https://www.princeton.edu/~gpop/PC% 20ref% 20groups% 20GPE% 20Dec09. pdf](https://www.princeton.edu/~gpop/PC%20ref%20groups%20GPE%20Dec09.pdf)* (2009).
- [23] STEPHANY, F. *Income Inequality and Organisational Trust in Europe— Perception and Reality*, 2014.
- [24] THOMPSON, W. C., FONG, G. T., AND ROSENHAN, D. L. Inadmissible evidence and juror verdicts. *Journal of Personality and Social Psychology* 40, 3 (1981), 453.
- [25] WEGENER, D. T., AND PETTY, R. E. Flexible correction processes in social judgment: The role of naive theories in corrections for perceived bias. *Journal of personality and social psychology* 68, 1 (1995), 36.
- [26] WILLARD, A. K., AND CINGL, L. Testing theories of secularization and religious belief in the Czech Republic and Slovakia. *Evolution and Human Behavior* 38, 5 (2017), 604–615.
- [27] XU, P., AND GARAND, J. C. Economic Context and Americans' Perceptions of Income Inequality*. *Social Science Quarterly* 91, 5 (2010), 1220–1241.

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Appendix A

Table 4: Description of variables

| Variable | Description |
|----------------------------|---|
| Perceived inequality index | Perceived inequality index refers to the mean of values from three questions concerning income inequality, and its interpretation is thus following: the higher the value of Perceived inequality index, the more critically a respondent tends to perceive the income inequality in the Czech Republic and Slovakia, respectively. |
| Inequality | Respondent's answer on the question regarding the wide gap between the rich and the poor. |
| District Gini (brutto) | Gini coefficient with respect to country's districts, calculation is based on income before the deduction of tax and insurance. |
| District Gini (netto) | Gini coefficient with respect to country's districts, calculation is based on wage, i.e. after tax and other sorts of deductions are made. |
| Czech | 1 = Czech respondent, 0 = Slovak respondent, it measures the difference between inequality perceptions in the Czech Republic and Slovakia. |
| Age | Respondent's age. |
| Education | Respondent's education level. |
| Household's income | Household's income is a categorical variable and represents household's income bracket. |
| Female | 1 = female, 0 = male. |
| Financial insecurity | Financial insecurity variable is based on a mean of values from four questions related to participant's fears of not having enough money or becoming destitute. |
| Government | Respondent's generalised trust in governmental institutions. |
| Social insecurity | Social insecurity measures the individual's fears about social services, such as welfare and healthcare failing. |

Table 5: List of NUTS 3 regions

| Region Name | Country Name |
|---|----------------|
| Banskobystrický Region | Slovakia |
| Bratislava Region | Slovakia |
| Hradec Králové Region | Czech Republic |
| South Bohemian Region (Jihočeský Region) | Czech Republic |
| South Moravian Region (Jihomoravský Region) | Czech Republic |
| Košice Region | Slovakia |
| Karlovy Vary Region | Czech Republic |
| Liberec Region | Czech Republic |
| Moravian-Silesian Region (Moravskoslezský Region) | Czech Republic |
| Nitra Region | Slovakia |
| Olomouc Region | Czech Republic |
| Pardubice Region | Czech Republic |
| Plzeň Region | Czech Republic |
| Prague Region | Czech Republic |
| Prešov Region | Slovakia |
| Central Bohemian Region (Středočeský Region) | Czech Republic |
| Trenčín Region | Slovakia |
| Trnava Region | Slovakia |
| Ústí nad Labem Region | Czech Republic |
| Vysočina Region | Czech Republic |
| Zlín Region | Czech Republic |
| Žilina Region | Slovakia |

Table 6: List of NUTS 2 regions

| Region Name | Country Name |
|--|----------------|
| Bratislava Region | Slovakia |
| Southeast Region (Jihovýchod) | Czech Republic |
| Southwest Region (Jihozápad) | Czech Republic |
| Moravian-Silesian Region (Moravskoslezsko) | Czech Republic |
| Prague Region | Czech Republic |
| Central Slovakia Region (Stredné Slovensko) | Slovakia |
| Central Bohemia Region (Střední Čechy) | Czech Republic |
| Central Moravia Region (Střední Morava) | Czech Republic |
| Northeast Region (Severovýchod) | Czech Republic |
| Western Slovakia Region (Západné Slovensko) | Slovakia |
| Eastern Slovakia Region (Východné Slovensko) | Slovakia |

Appendix B

Testing OLS assumptions of the first basic model

We began by simply plotting the model diagnostic to check for potential problems (Figure 3). The graph on the top left depicts plotted residuals against fitted values. The red line is fairly flat, and no pattern on the chart is seen. Thus the linearity assumption is met.

To check the assumption of equal variance - homoscedasticity, we first examine the scale-location plot, which shows that residuals are spread relatively equally along the ranges of predictors. For precise results, we performed Breuch-Pagan test. The p-value is equal to 0.8408; we fail to reject the null hypothesis, and therefore infer that the residuals are homoskedastic.

Although, after plotting the QQ-normal plot and performing the Shapiro-Wilk test, we suspect non-normality of residuals, we can rely on the large sample and the Central Limit Theorem.

Lastly, the residuals-leverage plot helps us to find influential cases. Not all outliers are influential in linear regression analysis. To determine whether outlying values are prominent for regression results, we look for examples outside of a dashed line, i.e. Cook's distance. In this particular model, we

can see there is no such case.

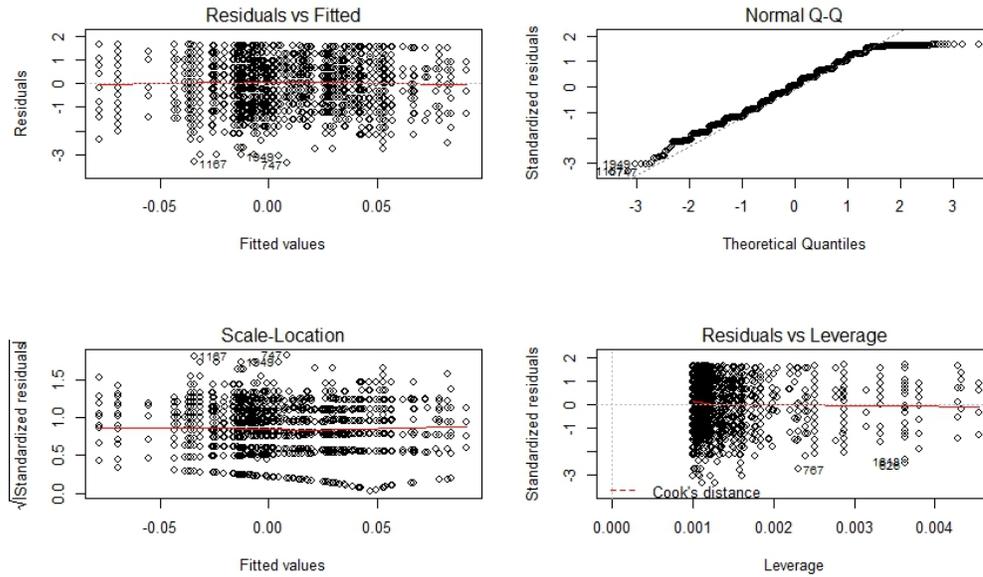


Figure 3: Summary diagnostics for the first basic model

Testing OLS assumptions of models from Table 1

In the models, where heteroskedasticity was detected, we used robust standard errors, specifically in the third and the fourth model (Column 3 and 4).¹⁰

The R-squared value of only 0.223 suggests that the overall performance of the model in the Column 4 is not impressive as the explanatory variables can explain only 22.3% of the variation in the Perceived inequality index. The F-statistic is highly significant, implying model provides a better fit than the intercept-only model. Nevertheless, statistical insignificance of several explanatory variables might indicate the presence of multicollinearity.

The correlation matrix (Figure 4) displays that the pair-wise correlation between all the explanatory variables is not very high, apart from the pairs: Age - Married, Social insecurity - Government and Czech - District Gini. The high correlation between these variables might cause multicollinearity

¹⁰Unlike Stata, the calculation of robust standard errors in RStudio is not exactly trivial. To replicate the results in RStudio as are in Stata, we used the HC1 estimator.

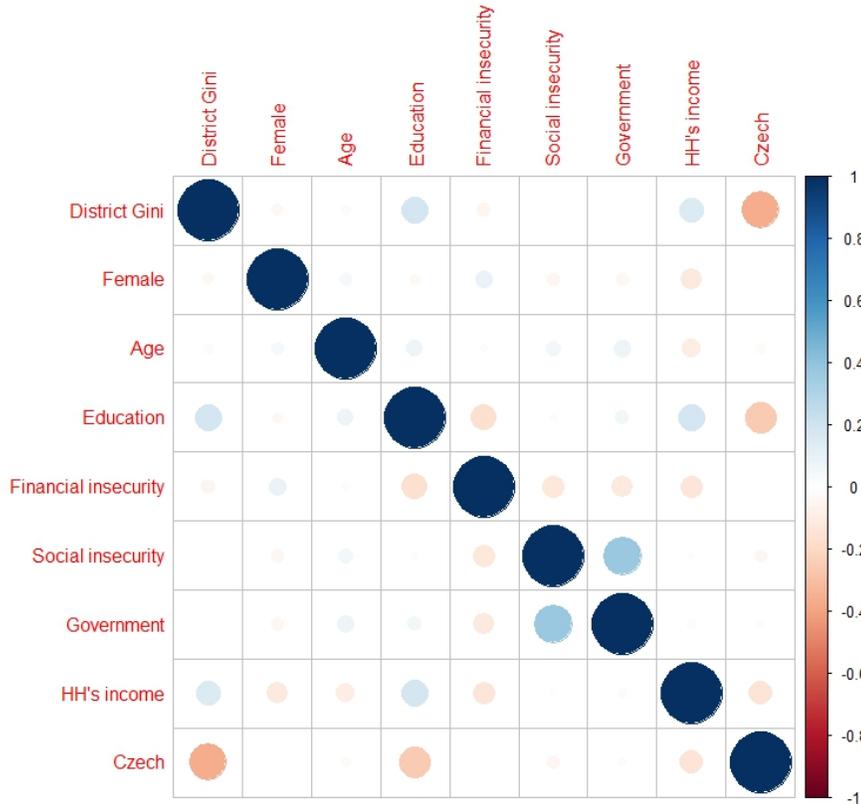


Figure 4: Correlation matrix

issues.

To receive precise results, we perform Farrar-Glauber test and other relevant tests for multicollinearity. The resulting value of the Chi-square test statistic is 1461.0006, thus implying the possible presence of multicollinearity in the model. Nevertheless, the next step of Farrar - Glauber test (F - test) for the location of the multicollinearity shows us, that the multicollinearity is not strong enough to bias our results. In other words, the observed value of F-test is less than the theoretical value. Thus we cannot reject the hypothesis that the variables are not multicollinear.

Testing OLS assumptions of the second basic model

Again, we briefly check for potential problems by plotting summary diagnostics (Figure 5). The residuals-fitted graph displays a flat red line and no pattern. Thus, the linearity assumption is met.

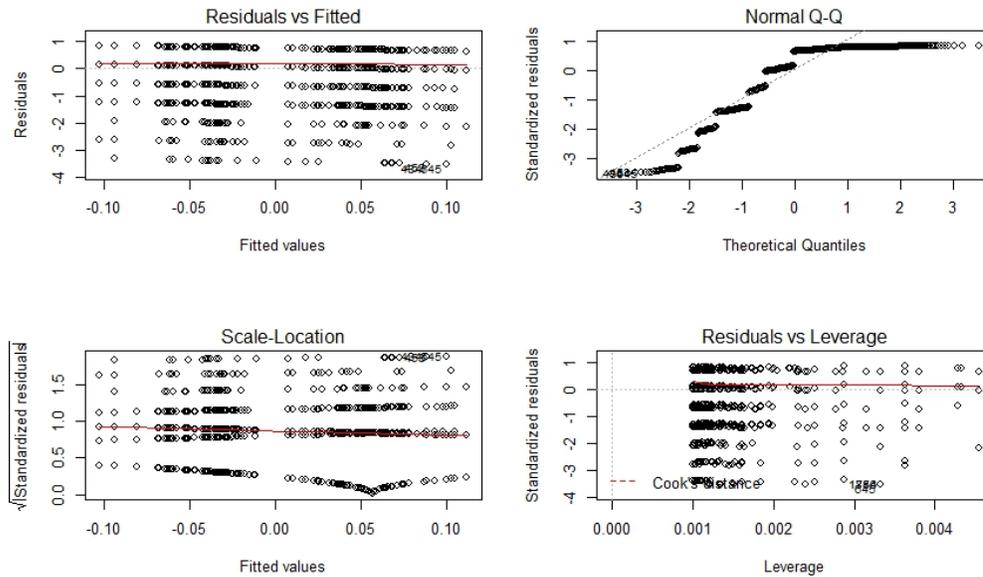


Figure 5: Summary diagnostics for the second basic model

Directly from the QQ-normal plot, we can see that the deviations from the straight line are considerable, which indicates normality of residuals is violated. Nevertheless, we can rely on a large number of observations.

To check the homoskedasticity assumption, we first examine the scale-location plot, which shows that residuals are spread more or less equally along the ranges of predictors. For precise results, we performed Breuch-Pagan test. The p-value is equal to 0.2102. Therefore we can infer that the residuals are homoskedastic.

Testing OLS assumptions of models from Table 2

In the models, where heteroskedasticity was detected, we used robust standard errors, specifically in all models except the first (i.e. the second basic model).

To check for the multicollinearity, we perform Farrar-Glauber test and other relevant tests. The resulting value of the Chi-square test statistic is 1461.0006, thus implying the possible presence of multicollinearity in the model. The next step of Farrar - Glauber test for the location of the multicollinearity shows us that pairs of variables Age - Married, Social insecurity -

Government and Czech - District Gini may cause distorted results in models where the Inequality is a dependent variable.

Appendix C

Adding NUTS 2 regions as explanatory variables

We apply an alternative specification of the models containing the regional fixed-effects. In the set of models (Table 7), we firstly regress Perceived inequality index on independent variables District Gini (brutto), including 11 region fixed-effects to distinguish NUTS 2 regions in the Czech Republic and Slovakia; then we gradually add additional explanatory variables. There are eight NUTS 2 regions in the Czech Republic and four NUTS 2 regions in Slovakia; we drop region of Prague¹¹ from the regression to avoid the dummy variable trap.

The relationship between District Gini and perceived income inequality is negative and highly insignificant in each model. Explanatory variable Age is highly significant in every model, while variables Household's income and Education display significant relationship with the dependent variable only in the second model (Column 2). Similarly as in previous models, Financial insecurity variable demonstrates a positive and highly significant link with the dependent variable. Further, the coefficients of Government and Social insecurity variables indicate a negative and highly significant relationship with perceived income inequality.

Above all, after controlling for NUTS 2 regional differences, the results still imply an insignificant relationship between district inequality and people's overall inequality perceptions.

¹¹The EU classifies Prague as both NUTS 2 and NUTS 3 regions, the same applies for several other regions. The detailed description can be found in Appendix A.

Table 7: The set of models with region-fixed effects (NUTS 2)

| | <i>Dependent variable:</i> | | | |
|------------------------|----------------------------|----------------------|----------------------|----------------------|
| | Perceived Inequality Index | | | |
| | (1) | (2) | (3) | (4) |
| District Gini (brutto) | -0.017 (0.032) | -0.018 (0.031) | -0.009 (0.030) | -0.023 (0.027) |
| HH's income | | -0.041* (0.023) | -0.010 (0.022) | -0.006 (0.023) |
| Female | | -0.020 (0.044) | -0.060 (0.042) | -0.084** (0.040) |
| Age | | 0.015*** (0.002) | 0.015*** (0.002) | 0.017*** (0.002) |
| Education | | -0.035*** (0.010) | -0.015 (0.010) | -0.015 (0.010) |
| Financial insecurity | | | 0.292*** (0.022) | 0.246*** (0.022) |
| Social insecurity | | | | -0.237*** (0.022) |
| Government | | | | -0.128*** (0.023) |
| Constant | -0.016 (0.061) | -0.407*** (0.109) | -0.511*** (0.105) | -0.535*** (0.102) |
| Region fixed-effects | Yes | Yes | Yes | Yes |
| Observations | 1,988 | 1,988 | 1,986 | 1,975 |
| R ² | 0.003 | 0.052 | 0.133 | 0.225 |

Note:

*p<0.1; **p<0.05; ***p<0.01

Discarding all NA values of relevant variables

Table 8: The set of models with discarded all NA values of relevant variables

| | <i>Dependent variable:</i> | | | |
|------------------------|----------------------------|----------------------|----------------------|----------------------|
| | Perceived inequality index | | | |
| | (1) | (2) | (3) | (4) |
| Czech | 0.029 (0.048) | -0.005 (0.048) | 0.029 (0.047) | 0.012 (0.044) |
| District Gini (brutto) | -0.025 (0.024) | -0.018 (0.024) | -0.010 (0.023) | -0.017 (0.021) |
| HH's income | | -0.037 (0.023) | -0.009 (0.024) | -0.008 (0.023) |
| Female | | -0.021 (0.044) | -0.060 (0.042) | -0.085** (0.040) |
| Age | | 0.015*** (0.002) | 0.015*** (0.002) | 0.017*** (0.002) |
| Education | | -0.035*** (0.010) | -0.015 (0.010) | -0.015 (0.010) |
| Financial insecurity | | | 0.291*** (0.023) | 0.246*** (0.022) |
| Social insecurity | | | | -0.238*** (0.022) |
| Government | | | | -0.126*** (0.023) |
| Constant | -0.012 (0.033) | -0.393*** (0.099) | -0.511*** (0.098) | -0.567*** (0.092) |
| Region fixed-effects | No | No | No | No |
| Observations | 1,975 | 1,975 | 1,975 | 1,975 |
| R ² | 0.001 | 0.050 | 0.130 | 0.223 |

Note:

*p<0.1; **p<0.05; ***p<0.01

After discarding of all missing values of relevant variables, the subset now comprises 1975 observations. This last robustness check did not qualitatively affect our general conclusion.

Table 9: The sets of models with region-fixed effects & discarded all NA values of relevant variables

| | <i>Dependent variable:</i> | | | |
|------------------------|----------------------------|----------------------|----------------------|----------------------|
| | Perceived Inequality Index | | | |
| | (1) | (2) | (3) | (4) |
| District Gini (brutto) | 0.003 (0.035) | 0.001 (0.034) | 0.0002 (0.033) | -0.015 (0.030) |
| HH's income | | -0.038* (0.023) | -0.009 (0.022) | -0.006 (0.023) |
| Female | | -0.020 (0.044) | -0.060 (0.043) | -0.084** (0.040) |
| Age | | 0.015*** (0.002) | 0.015*** (0.002) | 0.017*** (0.002) |
| Education | | -0.035*** (0.010) | -0.015 (0.010) | -0.015 (0.010) |
| Financial insecurity | | | 0.289*** (0.022) | 0.245*** (0.022) |
| Social insecurity | | | | -0.237*** (0.023) |
| Government | | | | -0.127*** (0.023) |
| Constant | -0.116 (0.102) | -0.490*** (0.134) | -0.559*** (0.128) | -0.575*** (0.121) |
| Region fixed-effects | Yes | Yes | Yes | Yes |
| Observations | 1,975 | 1,975 | 1,975 | 1,975 |
| R ² | 0.008 | 0.056 | 0.134 | 0.227 |

Note:

*p<0.1; **p<0.05; ***p<0.01

Models using District Gini (netto) as an inequality measure

Table 10: The set of models with District Gini (netto) & Perceived inequality index as a dependent variable

| | <i>Dependent variable:</i> | | | |
|-----------------------|----------------------------|----------------------|----------------------|----------------------|
| | Perceived inequality index | | | |
| | (1) | (2) | (3) | (4) |
| Czech | 0.0002 (0.068) | -0.025 (0.067) | 0.020 (0.065) | -0.009 (0.061) |
| District Gini (netto) | -0.032 (0.034) | -0.021 (0.034) | -0.011 (0.032) | -0.023 (0.030) |
| HH's Income | | -0.043* (0.023) | -0.012 (0.024) | -0.008 (0.023) |
| Female | | -0.021 (0.044) | -0.060 (0.042) | -0.085** (0.040) |
| Age | | 0.015*** (0.002) | 0.015*** (0.002) | 0.017*** (0.002) |
| Education | | -0.036*** (0.010) | -0.015 (0.010) | -0.015 (0.010) |
| Financial insecurity | | | 0.293*** (0.023) | 0.246*** (0.022) |
| Social insecurity | | | | -0.238*** (0.022) |
| Government | | | | -0.126*** (0.023) |
| Constant | 0.002 (0.041) | -0.379*** (0.100) | -0.502*** (0.100) | -0.555*** (0.094) |
| Region fixed-effects | No | No | No | No |
| Observations | 1,988 | 1,988 | 1,986 | 1,975 |
| R ² | 0.001 | 0.050 | 0.131 | 0.223 |

Note:

*p<0.1; **p<0.05; ***p<0.01

When using the District Gini netto instead, we can see that the results are qualitatively similar.

Table 11: The set of models with District Gini (netto) & Inequality as a dependent variable

| | <i>Dependent variable:</i> | | | |
|-----------------------|----------------------------|----------------------|----------------------|----------------------|
| | Inequality | | | |
| | (1) | (2) | (3) | (4) |
| Czech | 0.052 (0.068) | 0.059 (0.070) | 0.100 (0.068) | 0.080 (0.067) |
| District Gini (netto) | -0.030 (0.034) | -0.025 (0.035) | -0.015 (0.034) | -0.023 (0.034) |
| HH's Income | | -0.071*** (0.026) | -0.043* (0.025) | -0.040 (0.025) |
| Female | | 0.050 (0.045) | 0.014 (0.044) | 0.0004 (0.043) |
| Age | | 0.010*** (0.002) | 0.009*** (0.002) | 0.010*** (0.002) |
| Education | | 0.012 (0.010) | 0.031*** (0.010) | 0.031*** (0.010) |
| Financial insecurity | | | 0.270*** (0.024) | 0.242*** (0.025) |
| Social insecurity | | | | -0.147*** (0.025) |
| Government | | | | -0.074*** (0.024) |
| Constant | -0.026 (0.041) | -0.474*** (0.109) | -0.588*** (0.108) | -0.617*** (0.106) |
| Region fixed-effects | No | No | No | No |
| Observations | 1,988 | 1,988 | 1,986 | 1,975 |
| R ² | 0.003 | 0.028 | 0.096 | 0.130 |

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 12: The sets of models with District Gini (netto) & region-fixed effects

| | <i>Dependent variable:</i> | | | |
|-----------------------|----------------------------|----------------------|----------------------|----------------------|
| | Perceived Inequality Index | | | |
| | (1) | (2) | (3) | (4) |
| District Gini (netto) | 0.008 (0.048) | 0.006 (0.047) | 0.008 (0.045) | -0.021 (0.041) |
| HH's income | | -0.043* (0.023) | -0.011 (0.022) | -0.006 (0.023) |
| Female | | -0.019 (0.044) | -0.059 (0.042) | -0.084** (0.040) |
| Age | | 0.015*** (0.002) | 0.015*** (0.002) | 0.017*** (0.002) |
| Education | | -0.035*** (0.010) | -0.015 (0.010) | -0.015 (0.010) |
| Financial insecurity | | | 0.291*** (0.022) | 0.245*** (0.022) |
| Social insecurity | | | | -0.237*** (0.023) |
| Government | | | | -0.127*** (0.023) |
| Constant | -0.116 (0.095) | -0.487*** (0.129) | -0.560*** (0.124) | -0.585*** (0.117) |
| Region fixed-effects | Yes | Yes | Yes | Yes |
| Observations | 1,988 | 1,988 | 1,986 | 1,975 |
| R ² | 0.008 | 0.056 | 0.135 | 0.227 |

Note:

*p<0.1; **p<0.05; ***p<0.01