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How Does Exposure to Covid-19 Influence Health and Income Inequality Aversion?

Abstract

We study the determinants of individual aversion to health and income inequality in three European countries and the effects of exposure to COVID-19 including the effect employment, income and health shocks using representative samples of the population in each country. Comparing levels of health- and income-inequality aversion in the UK between the years 2016 and 2020 we find a significant increase in inequality aversion in both income and health domains. Inequality aversion is higher in the income domain than in the health domain and inequality aversion in both income and health domains is increasing in age and education and decreasing in income and risk appetite. However, people directly exposed to major health shocks during the COVID-19 pandemic generally exhibited lower levels of aversion to both income and health inequality. But for those at high risk of COVID-19 mortality who experienced major health shocks during the pandemic, inequality aversion was significantly higher than for those of similar individuals experiencing a health shock prior to the pandemic.

JEL-Codes: I180, I300, I380.

Keywords: inequality aversion, income, health, Covid-19, attitudes to inequality, employment shocks, health shocks, difference in differences.

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1. Introduction

Inequality preferences play an important role in modern society for at least two reasons, namely they may affect observed levels of inequality and they may inform public policy decisions. They reflect personal and social concerns with respect to the distribution of welfare in society, often characterised as 'inequality aversion', and may capture society's evaluation of welfare loss from higher inequality (Atkinson 1970). By extension, one person's degree of inequality aversion represents that person's judgement about how far society should forgo increases in total outcomes to achieve a more egalitarian distribution.[1] Their role in informing policy is especially important when society experiences a significant collective health shock: so, it is important to understand the nature of inequality preferences in the context of a global pandemic. Changes in people's needs and circumstances arising from exogenous shocks can reduce their tolerance of inequality.[2] This paper contributes to the study of inequality aversion, focusing on the effects of the COVID-19 pandemic.

Nonetheless, inequality preferences cannot be assumed to be uniform across different domains of human experience. Specific egalitarianism suggests that the extent of inequality aversion may depend on the domain in life considered (Tobin 1970). Luck egalitarianism distinguishes the legitimacy of inequalities arising from unforeseen circumstances rather than choice (Barry 2006, Wikler 2002). So, people may differ in their sensitivity to inequality in different domains because of different perceptions in each domain and because unforeseen events may have different impacts in different domains. Furthermore, inequality issues may not be perceived in the same way in different societies (Gimpelson and Treisman 2018).

The COVID-19 pandemic has had far-reaching effects across Europe with the European Centre for Disease control and Prevention reporting 4.2 million confirmed cases of the virus and

[1] See Amiel *et al.* (1999), Pirttila and Uusitalo (2010), Johansson-Stenman *et al.* (2002), Carlsson *et al.* (2005).
[2] Tricomi *et al.* (2010) find neural evidence suggesting that highly paid individuals exhibit higher gains from paying others as compared to paying themselves.

over 196,000 deaths (ECDC 2020). It has given rise to declines in income and wealth (Hanspal *et al.* 2020) and has strained government welfare programmes and increased economic anxiety (Bitler *et al.* 2020, Fetzer *et al.* 2020). The pandemic provides an opportunity to examine how inequality aversion changes in a time of crisis, paying attention to the role of risk aversion, specific risk perceptions and personal exposure to the health or economic consequences of the pandemic in shaping these behaviours. A recent review of the effect of viral pandemics suggests that it is not clear from the literature whether individuals become more tolerant and cooperative during a pandemic (Seitz *et al.* 2020). However, there is evidence that individuals who were more pro-social before the pandemic engaged in desirable health-related behaviours during the pandemic such as physical distancing, following hygiene recommendations, informing themselves about how they can help others; and donating financial resources towards efforts to fight COVID-19 (Campos-Mercade *et al.* 2021).

In this paper we report the elicitation of individual-level health- and income-inequality aversion[3] and record health and employment shocks experienced during the first wave of the COVID-19 pandemic. We estimate how individual-level aversion to health and income inequality varies across Italy, Germany, and the United Kingdom, and whether inequality aversion is affected by health, income and employment shocks.

The paper is organised as follows. Section 2 sets out the theoretical background and related literature. Section 3 describes the survey, elicitation strategy, and empirical specification. Section 4 contains the descriptive results for the 3 countries. Section 5 presents the results from regression analysis describing the impacts of health and employment shocks on health and inequality aversion conditional on controlling for key confounding variables such as income, education, demographics and especially risk aversion. Section 6 reports the results from a range

[3] This implies giving up on some of the traditional assumptions of inequality aversion experiments such as veil of ignorance approaches (Costa-Font and Cowell 2019).

of difference-in-differences strategies where we compare the impact of exposure to COVID-19 on inequality aversion in different risk groups in the United Kingdom; finally. section 7 concludes.

2. Background

2.1. Theoretical background

The concept of inequality aversion (IA) can be applied to distributions in different *domains*, wealth, health and so on. To fix ideas, let us talk about "domain x" which could be any one of these; each person i has an amount x_i in this domain, the mean value of x over the n persons in society is μ and the inequality (according to some specified inequality measure) for the distribution in domain x is I.

It is useful to contrast three different ways of thinking about IA. We could (1) think about IA in terms of the rate at which "society" is prepared to accept a reduction in μ in exchange for a reduction in I (Atkinson 1970). We could instead (2) think about IA in terms of i's *personal* evaluation; if i's utility depends on x_i and I then IA can be seen as i's evaluation of a personal tradeoff between the two (Carlsson et al. 2005). Finally, we could (3) think about IA as i's *social* evaluation; if i has views on social aggregates then IA can be seen as i's evaluation of a personal tradeoff between μ and I.

Here we adopt approach (3): individual evaluation of social tradeoffs between the mean of x and the inequality of x. For present purposes we could use one of the simplest representations of these individual preferences about social choices:

$$[1-\gamma_i]\log\mu-\gamma_i\log I,$$

(or an increasing transformation of this) where γ_i is a taste parameter that represents i's implicit price of inequality reduction; if $\gamma_i > 0$, then person i is inequality averse. A one percent reduction in inequality is valued by i as being worth a $\gamma_i/[1-\gamma_i]$ percent reduction in mean

income: if $\gamma_i = 0$ then i gives priority to mean income and if $\gamma_i = 1$ then i gives priority to inequality.[4]

In this paper, we focus on the elicitation of the preference parameter γ_i in the income domain and the health domain separately, the factors that appear to account for differences in γ_i between subgroups of the population, and the role that exposure to COVID-19 may have had in shifting this parameter.

2.2. Inequality aversion in income and health

Studies eliciting direct measures of income-inequality aversion differ in the instruments employed, and more generally estimates suggest significant heterogeneity when experimental methods are used. Leaky buckets experiments (examining the tolerance to transferring income from the rich to the poor) indicate values of inequality aversion close to zero (Amiel *et al.* 1999, Pirttila and Uusitalo 2010). However, methods based on eliciting direct preferences over alternative income distributions, typically in larger samples, using different elicitation techniques such as the imaginary grandchild, suggest estimates that are ten times larger (Johansson-Stenman *et al.* 2002, Carlsson et al. 2005).

Studies eliciting health-inequality aversion have not been conducted as extensively as they have in the income domain. In the context of attitudes towards the distribution of organ transplants, Ubel and Loewenstein (1996) showed that individuals prefer an egalitarian equilibrium of giving everyone the chance of having a transplant rather than excluding those least likely to have a successful transplant. Leibler *et al.* (2009) found that support for a Pigou-Dalton transfer from the better off to the worse off was stronger in the income as opposed to

[4] As noted, one could use any cardinalisation involving a monotonic transformation of this log-linear formula. We have used this particular cardinalisation to make the connection to the empirical application in section 3 clear. In section 3 we we report the elicitation of respondents' views on a scale from 1 to 10, so that the aversion parameter is simply rescaled. Notice that this log-linear formula is easily reinterpreted for the other approaches to IA. For approach (1) γ_i is restricted to being the same value for all i. For version (2) we replace the argument μ by x_i.

health domain. Consistent with these findings, Abásolo and Tsuchiya (2018) employ survey evidence from Spain to compare losses in income and health from an ex-ante and an ex-post (or outcome) perspective and find that income-inequality aversion is stronger than health-inequality aversion. Finally, Hurley *et al.* (2020) estimate income and health-inequality aversion for a sample of the general public in Ontario (provide of Canada) using a publicly representative online survey and distinguish between bivariate inequality aversion and univariate inequality aversion employing comparable instruments. They find evidence of st*rong income-inequality aversion and weaker aversion to health inequality and income-related health inequality*. However, these studies provide data from only single countries, do not attempt to examine changes over time, nor explore the impacts of shocks such as the employment and health shocks associated with COVID-19 on inequality aversion.

Despite substantial global policy concern about health inequality and universal health coverage (Marmot *et al.* 2012, Rodin and Ferranti 2012), individual health IA has been studied much less extensively than individual income IA and the two are rarely examined as distinct concepts (Abásolo and Tsuchiya 2013). This paper aims to redress that balance a little.

3. Data and Methods

3.1. Data

We used a set of surveys to elicit IA estimates and to analyse the determinants of IA preferences. The surveys collect data that are representative of the populations in three countries: online interviews were carried out during 29th-31st January 2016 (UK only) and 15th - 19th May 2020 amongst adults aged 16-75 in the UK and Germany, 16-70 in Italy.[5] The English version of the 2020 questionnaire used is reproduced on the next page.

[5] The surveys were carried out by ICM Unlimited (2016) and IPSOS-MORI (2020)

The 2020 survey was conducted during the initial stages of the COVID-19 pandemic in the UK, Germany, and Italy and adjusted the results for a range of interpersonal differences including: risk aversion (people who are risk loving tend to be less averse to inequality), income (people who are better off tend to be less averse to inequality), age (younger people are less averse to inequality), and education (better educated people tend to be more averse to inequality).

The survey consisted of two groups of questions. The first group (Q1, Q2) concerns individual preferences for inequality in the health and income domains, and the second group (Q3 – Q6) cover individual risk preferences and exposure to health, income and employment shocks.[6] In addition, information about gender, age and other personal characteristics was collected. The left-hand side of Table 1 gives the overall number of respondents and the breakdown by subgroups in the 2016 and 2020 subgroups. In each survey there were fewer female respondents than male, 70 to 75% were in the age range 25-64, and about half described themselves as being "medium" both in terms educational attainment and in terms of income level.

3.2. Methods

The main method here is an implementation of approach (3) to IA outlined in section 2.1, which is a contribution to the literature on the measurement of income inequality and to the broader literature in social science that has focused on health IA (Marmot *et al.* 2008, Lagomarsino *et al.* 2012).

[6] The 2016 survey included the same questions as the one for 2020 but did not ask about employment shocks.

Questionnaire

The following is the text of the questionnaire survey used in the Great Britain survey. A similar text was used in the Germany and Italy surveys.

The next few questions are asking about your general attitudes at this present time.

Q1. Would you say that reducing income inequality (income differences) in Great Britain is more or less important than improving its total national income?
Please read both statements and indicate your opinion on the following scale. The closer you place your answer to a statement the more it represents your opinion.

1. 1 **Reducing income inequality is more important than improving total national income**
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10 **Improving total national income is more important than reducing income inequality**
11. Don't know
12. Prefer not to say

Q2. Would you say that reducing the inequality (or individual differences) in life expectancy in Great Britain is more or less important than improving average population life expectancy in Great Britain?
Please read both statements and indicate your opinion on the following scale. The closer you place your answer to a statement the more it represents your opinion.

1. 1 **Reducing inequality in life expectancy is more important than improving average population life expectancy**
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10 **Improving average population life expectancy is more important than reducing inequality in life expectancy**
11. Don't know
12. Prefer not to say

…continued

Questionnaire (continued)

Q3. Are you generally a person who is willing to take risks or do you try to avoid taking risks?
Please answer on the following scale, where 1 is very unwilling to take risks and 10 is very willing to take risks.

1. 1 – Very unwilling to take risks
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10 – Very willing to take risks
11. Don't know
12. Prefer not to say

We would now like to ask you a couple of questions about you and your household's health and financial situation since the start of the coronavirus pandemic.

These are not mandatory to answer and there is a 'prefer not to say' option available. If you do answer these questions, this information will be kept securely and will only be combined with other people's answers when reporting the results so that you cannot be identified.

Q4. Have you or a member of your household suffered a medical emergency, in the last 3 months? Please select all that apply.

1. Yes, a minor medical emergency that did not require hospitalisation
2. Yes, a major medical emergency that required hospitalisation
3. No medical emergency in the last 3 months
4. Prefer not to say

Q5. Have you or a member of your household experienced any impact to finances in the last 3 months? Please select all that apply.

1. Yes, minor impact to finances
2. Yes, major impact to finances
3. No, there has been no change to finances
4. Prefer not to say

Q6. Still thinking about the last 3 months, which, if any, of the following describes your situation during this time? Please select all that apply

1. I or a member of my household has had a temporary salary reduction, but still working
2. I or a member of my household has been put on furlough
3. I or a member of my household has been placed on temporary unpaid leave
4. I or a member of my household has been made redundant
5. I or a member of my household has temporarily closed my/their own business
6. I or a member of my household has had to permanently close my/their own business
7. My or a member of my household's financial situation has changed for another reason
8. None of these
9. I prefer not to say

Table 1. Descriptive Statistics

2016

Country	
UK	2008

Age	
<25	185
25-64	1409
65+	414

Gender	
Male	1120
Female	888

	education	income
Low	60	333
Medium	975	981
High	939	495

Inequality, Risk Aversion (Q1, Q2, Q3)			
	γ^y	γ^h	ρ
mean	0.528	0.450	0.545
Low	5.8%	9.1%	3.4%
Medium	85.6%	85.4%	86.6%
High	8.6%	5.4%	10.0%
N	1943	1951	1979

Shocks (Q4, Q5)		
	health	*income*
No shock	1490	1653
Minor	307	224
Major	187	108

2020

Country	
UK	2295
Italy	2189
Germany	1202

Age	
<25	764
25-64	4232
65+	690

Gender	
Male	2913
Female	2756

	education	income
Low	629	1598
Medium	3126	2461
High	1934	927

Inequality, Risk Aversion (Q1, Q2, Q3)			
	γ^y	γ^h	ρ
Mean	0.568	0.504	0.546
Low	6.6%	8.4%	3.9%
Medium	78.1%	81.3%	86.5%
High	15.3%	10.4%	9.6%
N	6754	6549	7456

Shocks (Q4, Q5)			
	health	*income*	*employm't*
No shock	4627	2807	2538
Minor	502	1575	2665
Major	414	1128	303

Note: γ^y, γ^h, ρ mean, respectively, income-inequality aversion, health-inequality aversion, risk aversion

Although we do not elicit the value of γ_i (introduced in section 2.1) directly through experimental methods, questions 1 and 2 are used to elicit income IA and health IA by directly inviting responses about distributional judgments. The responses in Q1 and Q2 run from 1

(priority to inequality) to 10 (priority to the total income). So, to obtain the estimates of IA we use the formula $\gamma_i = [10 - q_i]/9$ where q_i is the chosen response to Q1 or Q2 respectively.

In a similar way the responses to Q3 can be used to provide a measure of risk aversion (RA): $\rho_i = [10 - q_i]/9$ where q_i is the chosen response to Q3.

For both IA and RA special consideration is given to the extreme values where γ_i, ρ_i take the values 0 or 1, as explained in section 4 below.

3.3. Econometric Model

Relatively little is known about factors that explain changes in inequality aversion attitudes, although it is plausible that changes in health or economic conditions affect the way that individuals view inequality and their preferences. Most evidence on determinants of inequality aversion comes from small-scale experiments with limited external validity.[7]

The empirical approach involves specifying a model of γ_i^d, the inequality aversion of person i in domain d, where d is either y (income) or h (health). We have two main specifications, the results of which are presented in sections 5 and 6 respectively.

The basic specification is:

$$\gamma_i^d = \alpha_0 + \alpha_1 s_i + \alpha_2 C_k + \alpha_3 X_i + \varepsilon_i, \quad (1)$$

where γ_i^d is person i's inequality aversion in dimension d, s_i is a shock experienced by i, C_k captures country-k specific effects and X_i captures the effects on i of income, education, risk preferences, demographics and other variables that can affect inequality preferences.

Clearly the time element is absent from equation (1), but the specification can be adapted to include the effects on IA resulting from vulnerability to COVID-19, and the effects of personal health and financial shocks observed in 2016 and in 2020. We can, of course, introduce

[7] Examples of previous research using small-scale experiments include Amiel and Cowell (1999), Bolton and Ockenfels (2000), Bosmans and Schokkaert (2004), Carlsson et al. (2005), Cowell and Schokkaert (2001), Fehr and Schmidt (1999).

γ_{it}^d and X_{it} as the time-varying counterparts of γ_i^d and X_i; but we need to do more to construct a causal model.

This can be done by considering COVID-19 as a "treatment" that affects a subgroup of the target population.[8] This subgroup may be defined in terms of experienced shocks or in terms of vulnerability (for example in terms of age). The general form of the required model is

$$\gamma_{it}^d = \beta_0 + \beta_1 P_t + \beta_2 T_{it} + \beta_3 P_t T_{it} + \beta_4 X_{it} + \varepsilon_{it} \qquad (2)$$

where P_t is a *pandemic dummy* which takes the value 1 if the year is 2020 and 0 otherwise, and T_{it} is a variable that specifies the treatment group, taking the value 1 if i is in the group at time t and 0 otherwise (i is in the control group). In this case the treatment group consists of those who are "targeted" by Covid-19, so that T_{it} can be expressed as

$$T_{it} = \phi(s_{it}, v_{it})$$

where s_{it} is a *shock indicator* indicating whether person i reported a specified shock at time t, and v_{it} is a *vulnerability indicator* indicating whether i belongs to a specified vulnerable group at time t.

To apply the difference-in-differences (DiD) method using equation (2) we need to make precise the specification of the indicators s_{it}, v_{it} and the function ϕ used in determining the treatment group for the COVID-19 pandemic. For example, if membership of the COVID-19 treatment group requires *both* experiencing a shock *and* being in the vulnerable group, then we could just have $\phi(s_{it}, v_{it}) = s_{it} v_{it}$. This issue is discussed further in section 6.

[8] Several papers have used this type of approach to model the effect of some type of natural disaster. See, for example, Behrman and Weitzman (2016), Rodríguez-Oreggia et al., (2008)

4. Results: Descriptive Evidence

4.1. Overview

The right-hand side of Table 1 provides a first impression of the evidence on attitudes towards inequality and risk, elicited from Q1, Q2, Q3 and then captured by the individual values of the aversion parameters $\gamma_i^y, \gamma_i^h, \rho_i$.

It is clear from the rows labelled "mean" for 2016 and 2020 that, on average, IA is higher for income than for health and that IA in each domain is higher in 2020 than in 2016. By contrast, RA in 2020 is approximately the same as in 2016. However, Table 1 reveals more about the patterns of IA and RA by summarising responses in three broad categories – Low, Medium and High. In each case the row labelled "High" refers to cases where the respondent chose $q_i = 1$ from the 1 – 10 scale, which would then yield the extreme value $\gamma_i^y = 1$ (in the case of Q1), or $\gamma_i^h = 1$ (for Q2) , or $\rho_i = 1$ (for Q3).[9] What is remarkable is that the proportion of respondents in the "High" IA category in 2020 is almost twice what it was in the 2016 sample. This applies to both dimensions, income, and health, but it does *not* apply to RA, where the proportion in the "High" category was slightly lower in 2020. Three questions arise, discussed in subsections 4.2 to 4.4.

4.2. Inequality aversion, risk aversion and risk

First, what could be behind this difference in IA? At first glance it does not seem to be driven by a difference in risk *aversion*, so what about a perceived change in risk itself? A preliminary look at the information on shocks that were reported show that, in the 2016 sample, 15.5% of the sample reported a minor health shock and 9.4%; these proportions were actually lower in the 2020 sample (9% minor and 7.5% major). But the picture with income shocks is in sharp contrast: the

[9] Likewise "Low" refers to cases where the respondent chose $q_i = 10$, which would then yield the extreme value $\gamma_i^y = 0$ (in the case of Q1), or $\gamma_i^h = 0$ (for Q2) , or $\rho_i = 0$ (for Q3); "Medium" refers to cases where the respondent chose $q_i = 2,3, \ldots, 9$ which yields an aversion parameter lying strictly between 0 and 1.

proportion of the 2020 sample that experienced a shock is almost three times the proportion in the 2016 sample.

4.3. Country breakdown in 2020

The second question is this: given that the 2020 sample covers three countries, what does the evidence on inequality-aversion and risk-aversion look like when we unpack the responses from the different national subsamples?[10] The top half of Table 2 provides this information in the same format as the bottom half of Table 1.

Begin with inequality aversion. In 2020, for each country $\bar{\gamma}^{y}$, the average value of income-inequality aversion, is higher than $\bar{\gamma}^{h}$, the average value of health-inequality aversion); remarkably the $\bar{\gamma}^{y} - \bar{\gamma}^{h}$ gap for Germany is twice as large as that in Italy.[11] The Germans emerge as the most income-inequality averse of the three nations in terms of the mean value $\bar{\gamma}^{y}$ and also in terms of the proportion of respondents in the "High" category (where $\gamma^{y} = 1$). Table 2 also shows that UK is the most health-inequality averse of the nations, again in terms of the mean value $\bar{\gamma}^{h}$ and in terms of the proportion of respondents in the "High" category (where $\gamma^{h} = 1$).

We can also use Table 2 to compare the UK with itself: Comparing the UK situation in 2016 (top right of Table 1) and the situation in 2020 (top left of Table 2) the difference in $\bar{\gamma}^{h}$ is about twice the difference in $\bar{\gamma}^{y}$; the proportion of those reporting "High" inequality aversion (where γ^{y} or $\gamma^{h} = 1$) increased much more in the case of health than for income. This suggests that circumstances of 2020 may have had a stronger effect on health-inequality aversion than on income-inequality aversion in the UK.

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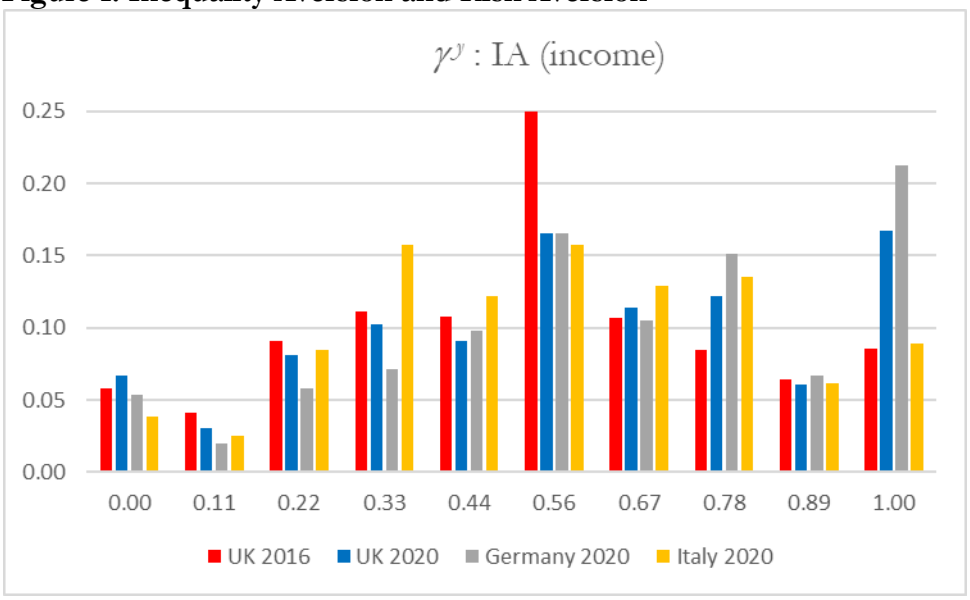
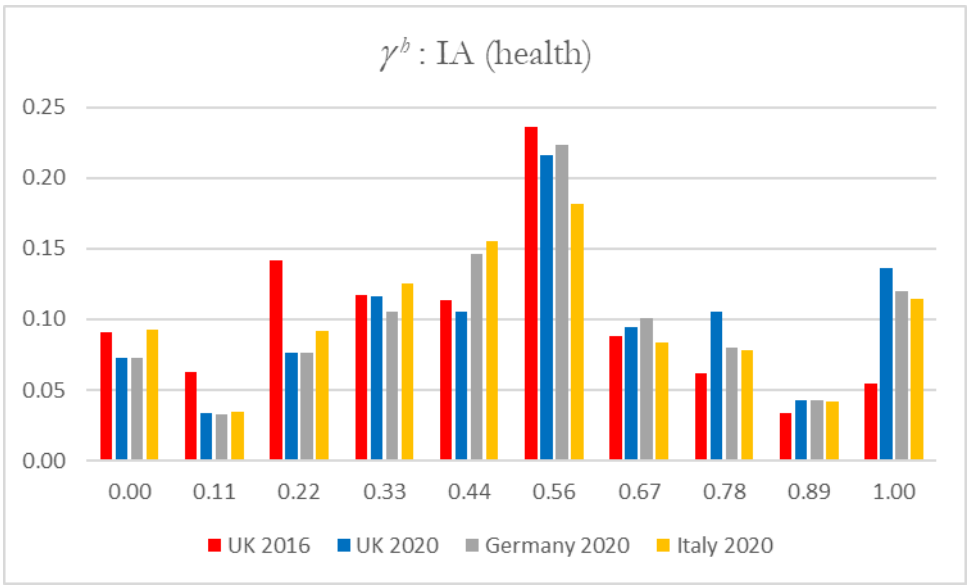
[10] A more detailed breakdown is given in Appendix A.
[11] For pre-COVID19 evidence see Hurley *et al.* (2020).

Figure 1: Inequality Aversion and Risk Aversion





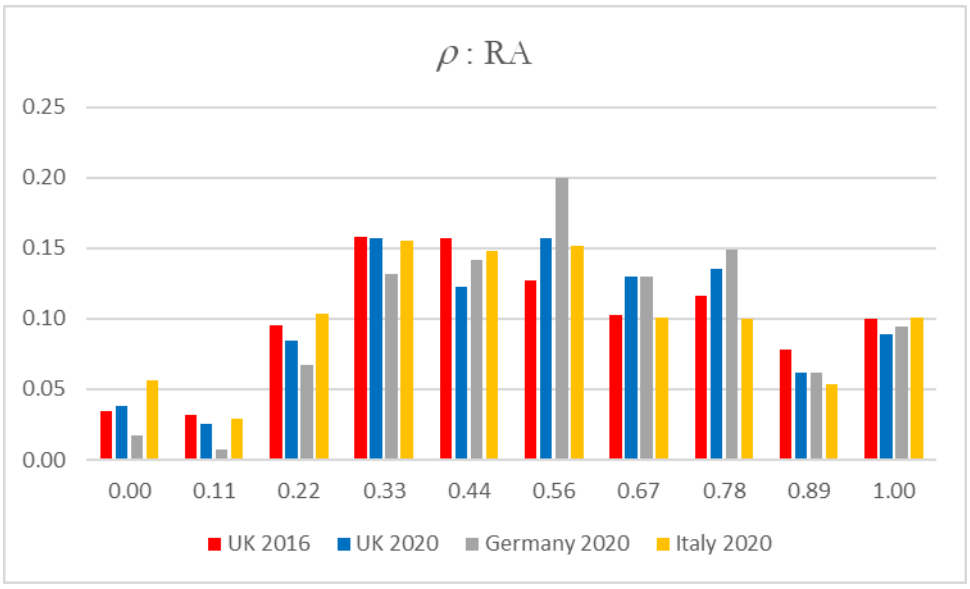


Table 2. Inequality and risk aversion: country detail

	Inequality, Risk Aversion (by country, 2020)								
	UK			*Italy*			*Germany*		
	γ^y	γ^h	ρ	γ^y	γ^h	ρ	γ^y	γ^h	ρ
mean	0.579	0.546	0.551	0.564	0.505	0.522	0.633	0.532	0.585
Low	6.7%	7.3%	3.8%	7.9%	9.3%	5.6%	5.3%	7.3%	1.8%
Medium	76.6%	79.1%	87.3%	74.5%	79.3%	84.3%	73.4%	80.8%	88.8%
High	16.7%	13.6%	8.9%	17.6%	11.5%	10.1%	21.3%	11.9%	9.5%

	Within-year correlations				
	UK 2016	*UK 2020*	*It 2020*	*Ger 2020*	*All 2020*
$\text{corr}(\gamma^y, \gamma^h)$	0.563	0.571	0.588	0.422	0.558
$\text{corr}(\gamma^y, \rho)$	0.169	0.193	0.227	0.092	0.185
$\text{corr}(\gamma^h, \rho)$	0.113	0.134	0.189	0.087	0.137

Note: γ^y, γ^h, ρ mean, respectively, income-inequality aversion, health-inequality aversion, risk aversion

Now look at the estimates of risk aversion, ρ. Table 2 shows that, as with income-inequality aversion, Germany is the most risk averse, followed by the UK; this is also borne out by the proportion of respondents in the "Low" category (where $\rho = 0$) in each country: Italy has the lowest proportion of low-RA respondents, followed by the UK. Again, compare the situation of UK 2016 with that of UK 2020: the mean value of ρ increased slightly, but the proportion of respondents in the "High" category (where $\rho = 1$) is *lower* in 2020. This is in sharp contrast to what appears to have happened to inequality aversion, in either domain.

Figure 1 shows the detail of the distributions of γ^y, γ^h, ρ derived from the responses from questions 1 to 3 in the survey. In the first two panels of Figure 1 compare the red bars (UK 2016) with the blue (UK 2020): the shift of observations from the mid-range of γ in 2016 to $\gamma = 1$ in 2020 is dramatic. Also clear is the contrast in Germany 2020 between the distribution of γ^y (first panel) and the distribution of γ^h (second panel). A further point is evident when we compare these two panels with the third panel showing the distribution of ρ: one is struck by the similarity of the height of the red and blue bars at each of the ten values of ρ

indicates that the distribution of estimated risk aversion in 2020 is much the same as in 2016. The contrast in the pictures for γ and the picture for ρ is striking and reinforces the view that the difference in inequality aversion between 2016 and 2020 is not principally attributable to a change in risk aversion.

4.4. Types of inequality aversion

The third question that arises is this: is there strong correlation between types of aversion? Are the high IA people the same ones in both income and health domains? Are high risk-aversion people also high inequality-aversion people? The lower part of Table 2 addresses this. For the UK (both 2016 and 2020) and Italy the correlation between γ^y and γ^h (individual inequality aversion in the two domains) lies between 0.56 and 0.59; in Germany it is somewhat lower. But the correlation between individual inequality aversion (in either domain) and risk aversion is much lower, for all countries.

5. Regression evidence of inequality aversion

We use a cross-section regression analysis based on equation (1) to probe a little deeper into the impressions obtained in section 4. For the cross-sectional analysis equation (1) is estimated separately for 2016 and 2020. The summary of the coefficient estimates is in Table 3.

5.1. Baseline

We take the "baseline case" to be a middle-aged, middle-income, medium-educated, risk-neutral, female respondent in the UK with no reported shocks.

Table 3: Determinants of health- and income-inequality aversion

	Health-inequality aversion 2020	Income-inequality Aversion 2020	Health-inequality aversion 2016	Income-inequality Aversion 2016
Age group (reference: 25-64)				
<25	-0.0283**	-0.0237*	-0.0217	0.00330
	(0.0141)	(0.0143)	(0.0238)	(0.0239)
65+	0.00694	0.0154	-0.0205	-0.0276*
	(0.0142)	(0.0142)	(0.0167)	(0.0167)
Gender (reference: female)				
Male	-0.00671	0.00270	0.0372***	0.0235*
	(0.00917)	(0.00921)	(0.0132)	(0.0131)
Education level (reference: medium)				
low education	-0.0171	-0.0235	0.107**	0.0944**
	(0.0164)	(0.0165)	(0.0418)	(0.0413)
high education	0.0416***	0.0327***	0.0465***	0.0453***
	(0.00995)	(0.0100)	(0.0135)	(0.0135)
Income level (reference: medium)				
low income	0.0215**	0.0196*	-0.0156	0.0166
	(0.0106)	(0.0107)	(0.0176)	(0.0176)
high income	-0.0296**	-0.0347***	-0.0444***	-0.0566***
	(0.0122)	(0.0123)	(0.0155)	(0.0154)
Risk aversion (0-1 scale)				
	0.156***	0.210***	0.127***	0.185***
	(0.0181)	(0.0181)	(0.0248)	(0.0248)
Country (reference: UK)				
Italy	-0.0317***	0.00467		
	(0.0103)	(0.0104)		
Germany	-0.0144	0.0486***		
	(0.0127)	(0.0127)		
Health shock (reference: none)				
Minor health shock	-0.0337**	-0.0237	-0.0146	-0.0309*
	(0.0155)	(0.0157)	(0.0182)	(0.0182)
Major health shock	-0.0327*	-0.0437**	-0.0167	-0.0419*
	(0.0173)	(0.0178)	(0.0230)	(0.0229)
Income shock (reference: none)				
Minor income shock	0.0238*	0.0217	-0.00233	-0.00259
	(0.0136)	(0.0136)	(0.0210)	(0.0209)
Major income shock	0.0225	0.0218	0.0199	0.0207
	(0.0154)	(0.0155)	(0.0284)	(0.0283)
Employment shock (reference: none)				
Temporary employment shock	-0.0184	-0.0157		
	(0.0132)	(0.0132)		
Permanent employment shock	-0.00645	-0.0417*		
	(0.0227)	(0.0229)		
Constant	0.454***	0.457***	0.361***	0.418***
	(0.0169)	(0.0170)	(0.0206)	(0.0206)
Observations	3,982	4,163	1,734	1,730
R-squared	0.039	0.055	0.029	0.050

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

To interpret the coefficient estimates of the regression reported in Table 3, recall the definition of inequality aversion in section 2 and the description in section 4 of the method of using the survey responses to compute γ^h (IA, health domain) and γ^y (IA, income domain). For each domain, the notional scale of γ^h and γ^y runs from 0 (indifference to inequality) to 1 (total priority to inequality) – as does the scale of risk-aversion ρ.

In 2020, for either domain, a person fitting the profile of the baseline case would have displayed inequality aversion approximately in the middle of this range with $\gamma^h = 0.454$ and $\gamma^y = 0.457$ (see the constant term in each of the two left-hand columns). However, these figures represent a considerable increase on the IA-values that the baseline person would have displayed in 2016: $\gamma^h = 0.360$ and $\gamma^y = 0.418$ (see the two right-hand columns).

We proceed from the baseline case by examining the apparent impact on estimates of γ^h and γ^y arising from (1) risk-aversion and shocks, (2) personal characteristics, (3) country characteristics.

5.2. Risk aversion and shocks

It is clear from rows 6 and 7 of table 2 that, as risk aversion increases, so does inequality aversion: this result is to be expected (Amiel *et al.* 2001, Cowell and Schokkaert 2001); it applies to both health and income domains, and it applies in both years.

The effect of shocks is more nuanced (see the lower part of Table 3). Wherever the coefficient is significantly different from zero a health shock is associated with a lower estimated IA, in both income and health domains. However, only rarely is there a significant effect on IA from income shocks (positive, in the health domain 2020) or from employment shocks (negative, in the income domain 2020).

5.3. Personal characteristics

After examining the effect of personal characteristics, we identify a clear age effect in the 2020 sample. Notice that the coefficient on under 25's (or "< 25") is significant in both domains. One might be tempted to draw the conclusion "the older you are more the more inequality-averse you are." But this only applies to 2020 and only to a comparison between youth and the reference group – there is no effect from being elderly. However, in 2016 there is, in the income domain, an effect in the opposite direction – the elderly are less inequality averse than the reference group.

Although there is no significant difference between males and females in the 2020 sample, in the 2016 sample, males are more inequality-averse in terms of both health and income.

Having education higher than the reference level makes a person more inequality-averse in both domains and in both years of observation. Having education lower than the reference level has no significant effect on measured IA in 2020 but, again, has a positive effect on IA in 2016. On the other hand, the story with respect to income is simpler: having high income makes a person less inequality averse and (for 2020 only) having low income results in higher inequality aversion. Roughly speaking, the more income you have the less you are concerned about inequality.

5.4. Country subsamples

The contrast in IA between countries has already been glimpsed in Table 2. The rows labelled "Country" reveal the following for the 2020 sample.

In terms of health-inequality aversion there is no significant difference between the reference case in the UK and someone in Germany but switching from the reference case to Italy would lower the estimate of γ^h by 0.031.

In terms of income-inequality aversion there is no significant difference between the reference case in the UK and someone in Italy but switching from the reference case to Germany would raise the estimate of γ^y by 0.048.[12]

6. A difference-in-differences approach

Although section 5 showed that individuals who experienced health or employment shocks in their household during the COVID-19 pandemic tended to be significantly less inequality averse, this result might not be specific to a COVID-19 shock. So, to compare the effect of exposure to COVID-19 to similar health shocks pre-COVID, in this section we examine inequality preferences over time in the UK using a difference-in-differences specification.

6.1. Specification of the treatment group

The implementation of equation (2) in modelling the COVID "treatment" requires further consideration of three things:

- **Shocks s_{it}**. COVID related shocks potentially include both reported health shocks and reported income shocks. Shocks could be minor, major or both.
- **Individual vulnerability v_{it}**. This is based on the risk that a person might contract COVID-19, considering his/her personal characteristics. The characteristics that are appropriate to our problem are, in the first place, being in the older age groups and secondly, living in a high-risk region. In what follows we distinguish between single-source and multi-source vulnerability.
- **The function ϕ**. This can be chosen to be responsive either to s_{it} or to v_{it} or to both, giving us alternative variants of the treatment group.

[12] Appendix B provides detailed examination of alternative specifications of the regression equation (1)

Table 4: DiD regressions for standard treatment group (UK 2016 and 2020)

	(1) γ^h	(2) γ^h	(3) γ^y	(4) γ^y
P_t	0.0936***	0.0981***	0.0484***	0.0472***
	(0.00898)	(0.00950)	(0.00911)	(0.00952)
$s_{it}\, v_{it}$	-0.0474	-0.0234	-0.0765*	-0.0693
	(0.0472)	(0.0523)	(0.0464)	(0.0514)
$P_t s_{it}\, v_{it}$	0.239***	0.206**	0.200**	0.198**
	(0.0840)	(0.0876)	(0.0848)	(0.0860)
Conditioning covariates				
Age <25		-0.0392***		-0.0286*
		(0.0144)		(0.0146)
Age 65+		-0.0202		-0.0217*
		(0.0132)		(0.0132)
Male		0.000183		-0.00834
		(0.00949)		(0.00952)
low education		-0.00855		-0.000319
		(0.0240)		(0.0242)
high education		0.0591***		0.0552***
		(0.00978)		(0.00980)
low income		-0.00363		0.0105
		(0.0119)		(0.0120)
high income		-0.0397***		-0.0447***
		(0.0113)		(0.0114)
ρ		0.123***		0.194***
		(0.0182)		(0.0183)
Constant	0.451***	0.371***	0.530***	0.417***
	(0.00632)	(0.0151)	(0.00648)	(0.0152)
Observations	3,846	3,494	3,916	3,569
R-squared	0.031	0.060	0.009	0.056

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

6.2. The standard model

The principal focus will be on a *standard treatment group* characterised by the experience of health shocks and single-source vulnerability; the vulnerable are taken to be those aged over 65. The function ϕ is a simple multiplicative form so that:

$$T_{it} = s_{it} v_{it}.$$

Within this framework we can consider further sub-variants of the model by allowing for flexibility concerning the conditioning covariates X_{it}. We have the option of including or omitting other personal characteristics and risk attitudes in the DID equation (2). In effect we may choose to constrain the parameter β_4 to be zero.

The model is estimated for the two UK samples (2016 and 2020) and the principal results for the standard treatment group[13] are presented in Table 4.

6.3. Health-inequality aversion

Columns 1 and 2 of Table 4 summarise the key results for γ^h. Recall that γ^h has a minimum of 0 and a maximum of 1. We see from column 1 that, if conditioning covariates are excluded from the estimation, there is an increase of 0.24 in health-inequality aversion for people that experienced a health shock in 2020 and were part of a high COVID-19 risk age group compared to people in a high-risk age group that exhibited a health shock in 2016. The effect is slightly less (0.21) if conditioning covariates are included in the estimation.

6.4. Income-inequality aversion

The results for γ^y (also measured on a [0,1] scale) reveal a similar picture to the results for γ^h – see columns 3 and 4 of Table 4. Comparing people who experienced a health shock in 2020 and were part of a high-risk age group with people in similar circumstances in 2016, column 3 shows an increase of about 2.0 in income-IA. This effect is only very slightly reduced if conditioning covariates are included in the estimation (column 4).

[13] For an exhaustive treatment of alternate specifications see Appendix C. The four columns of Table 4 are based on Tables C2, C4, C6 and C8 in Appendix C

7. Conclusion

Individual inequality aversion (IA) is important for understanding both how people perceive inequality, and their public priorities concerning distribution of relevant outcomes, especially in the income and health domain. Understanding IA in a time of crisis is crucial for public policy making.

Accordingly, we have focused on individual IA in terms of income and in terms of health in Germany, Italy and the UK during the first year of the COVID-19 pandemic. For the UK similar estimates are also produced for 2016 and are used to identify the impact of the pandemic on inequality aversion.

Cross-sectional analysis shows the following. First, in each subsample people are more inequality averse with respect to income than health. Second, people in the UK were more inequality averse in 2020 than in 2016, with the difference in IA for health twice that for income. Third, in all three countries, being risk-loving and having a higher income are associated with significantly lower levels of IA; but being older and having more education is associated with higher levels of IA. Fourth, people experiencing health or employment shocks during the COVID-19 pandemic were less averse to health and income inequality; but experiencing a similar shock in 2016 did not significantly modify health-IA estimates. This is consistent with the effect of reducing empathy during a catastrophe such as a pandemic (Seitz et al, 2020).

Using a difference-in-differences model for the UK, we find that people who were in high COVID-19 risk groups (age 65+ and in a high-risk region) and who at the same time experienced a health shock during the pandemic displayed significantly higher level of both health IA and income IA than similar people in 2016. These effects are not driven by a change in

innate risk aversion[14] but may have been attributable to the changed circumstances specific of the pandemic.

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[14] As we saw in Tables 1 and 2, the mean value of ρ in the UK sample was 0.545 in 2016 and 0.551 in 2020. For the treatment group t the mean value of ρ was 0.614 in 2016 and 0.628 in 2020: so although risk aversion in the treatment group was significantly higher than in the UK as a whole the difference between the 2016 and the 2020 values of ρ was still modest.

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Appendix A: Descriptive Statistics -- detail

A comparison of estimates across age groups (Tables A1 and A2), shows that the differences described in the text are primarily driven by older and middle-aged people. Income-inequality aversion is larger amongst older and middle-aged people in Germany than the corresponding groups in Italy and the UK; there are no significant cross-county differences in health-inequality aversion. There is little evidence to suggest any gender differences in inequality aversion in either domain (Tables A3, A4 and A5).

Figures A1 – A6 provide graphical evidence of differences in health- and income-inequality aversion in the UK by age, income group and gender in 2016 and 2020. They suggest lower levels of inequality aversion among younger individuals and higher income respondents**.**

Table A1: Within-country age differences in inequality aversion

	Obs (A)	Obs (B)	t value
Income IA – Germany			
A=Middle – B=Older Age	464	159	-2.9**
A=Young – B=Older Age	350	159	-4.85***
A= Young– B=Middle Age	350	464	-3.05***
Health IA- Germany			
Middle – Older Age	428	147	-.8
Young – Older Age	329	147	-1.25
Young – Middle Age	329	428	-.7
Income IA – Italy			
Middle – Older Age	1029	115	-.8
Young – Older Age	721	115	-2.2**
Young – Middle Age	721	1029	-2.95***
Health IA – Italy			
Middle – Older Age	993	112	-2**
Young – Older Age	694	112	-2.75***
Young – Middle Age	694	993	-1.7
Income IA – UK			
Middle – Older Age	892	259	1.35
Young – Older Age	822	259	-1.35
Young – Middle Age	350	464	-3.05
Health IA – UK			
Middle – Older Age	842	241	1.95
Young – Older Age	812	241	-1.05
Young – Middle Age	812	842	-4.5**

Note : Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A2: Between-country age differences in inequality aversion

	Obs 1	Obs 2	t value
Older			
Income IA Italy – Germany	115	159	-3.4
Income IA UK – Germany	259	159	-4.95
Income IA UK – Italy	259	115	-.75
Health IA Italy – Germany	112	147	.4
Health IA UK – Germany	241	147	-.55
Health IA UK – Italy	241	112	-.9
Middle			
Income IA Italy – Germany	1029	464	-3.9
Income IA UK – Germany	892	464	-2.3
Income IA UK – Italy	892	1029	1.95**
Health IA Italy – Germany	993	428	-1.4
Health IA UK – Germany	842	428	2.7
Health IA UK – Italy	842	993	5.05
Young			
Income IA Italy – Germany	721	350	-2.
Income IA UK – Germany	822	350	-1.65
Income IA UK – Italy	822	721	.9
Health IA Italy – Germany	694	329	-1.7
Health IA UK – Germany	812	329	-.2
Health IA UK – Italy	812	694	1.9

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A3. Within-country gender differences in IA

	Obs 1	Obs 2	t value
Germany Income IA Female-Male	462	511	-0.55
GermanyHealth IA Female-Male	419	485	0.7
Italy Income IA Female-Male	903	962	-1.45
Italy Health IA Female-Male	**868**	**931**	**-0.5**

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A4: Between-country Gender differences in IA

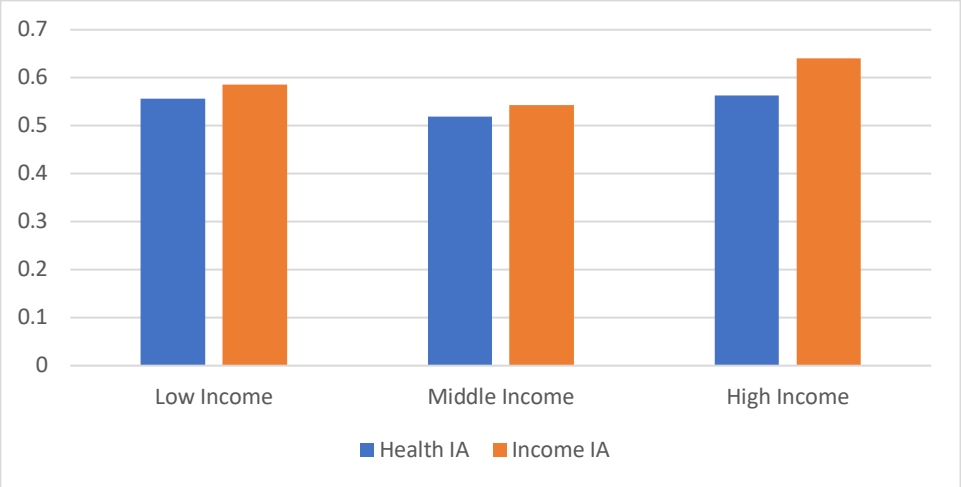
Female	**obs1**	**obs2**	**t- value**
Income IA Italy-Germany	903	462	-4.35
Health IA Italy-Germany	868	419	-2.25
Male	**obs1**	**obs2**	**t- value**
Income IA Italy-Germany	962	511	-3.95
Health IA Italy-Germany	931	485	-1.1

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A5: Inequality Aversion by Gender

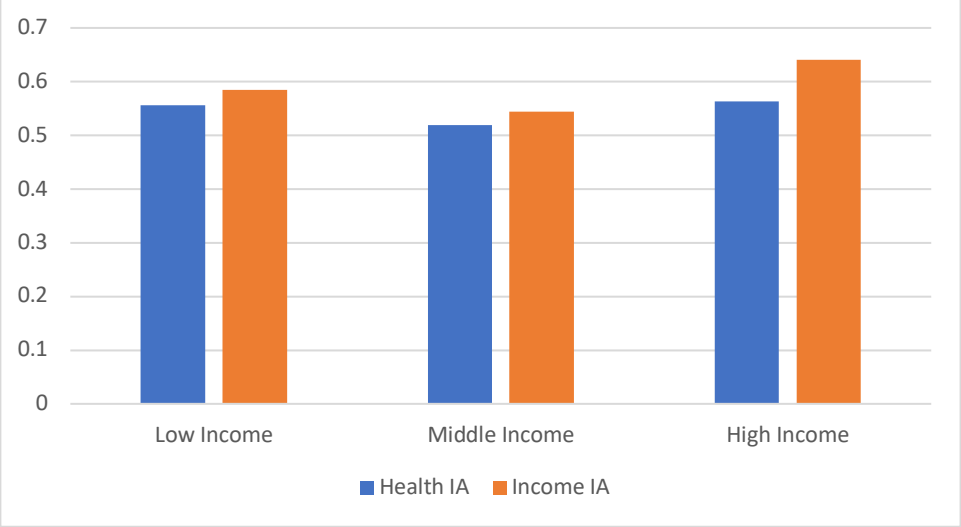
	Male		**Female**	
2016	Mean	St.Dev	Mean	St.Dev
Aversion to Income	0.526	0.261	0.530	0.275
Aversion to Health	0.437	0.267	0.465	0.264
Income Shock (percentage)	.153	.361	.178	.383
Health Shock (percentage)	.236	.425	.259	.439
2020	Mean	St.Dev	Mean	St.Dev
Aversion to Income	0.58	0.295	0.578	0.302
Aversion to Health	0.536	0.281	0.516	0.291
Income Shock (percentage)	.509	.5	.521	.5
Health Shock (percentage)	.17	.375	.165	.372

Figure A1: Age Differences in health-inequality aversion in 2016



Note: mean estimates of income and health-IA in the UK 2016

Figure A2: Age Differences in health-inequality aversion in 2020



Note: mean estimates of income and health-IA in the UK 2020

Figure A3: Income and Health-inequality aversion by income group 2016

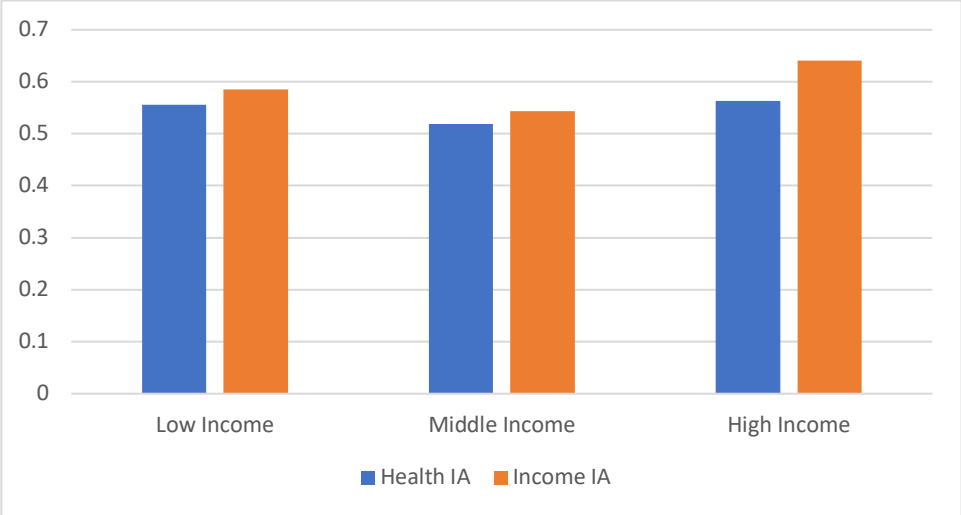


Figure A4: Income and Health-inequality aversion by income group 2020

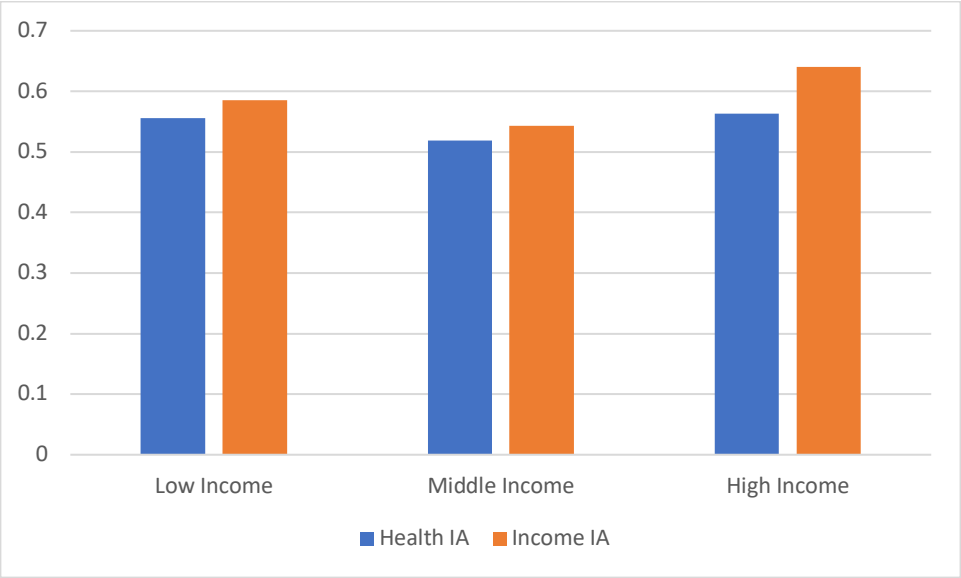
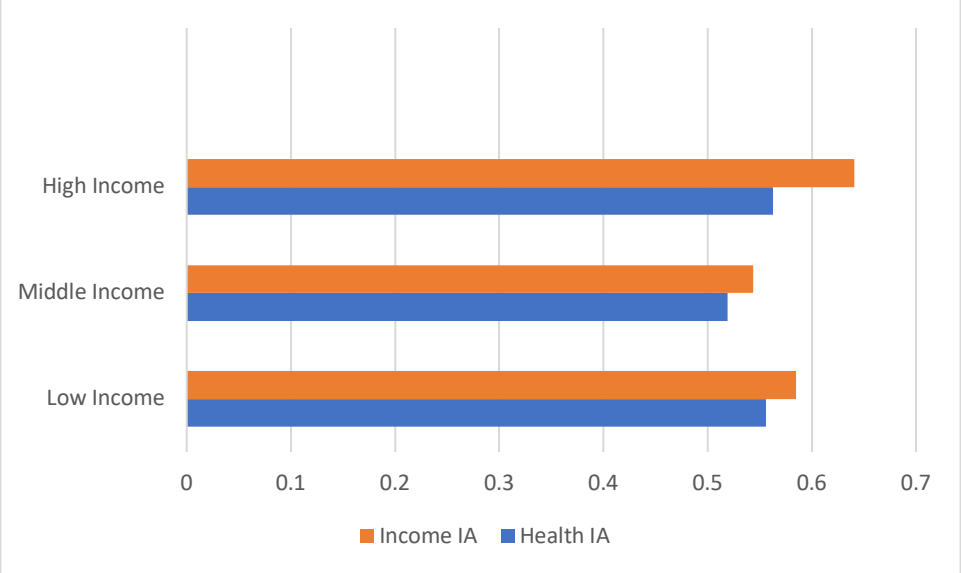


Figure A5: Income and health-inequality aversion by gender 2016-2020



Appendix B: Cross-sectional regressions -- detail

This appendix reports results from alternative specifications for the econometric model discussed in section 5 of the main text.

Table B1 reports results from alternative specifications for health-inequality aversion in 2020. Again, risk-loving individuals exhibit significantly lower inequality aversion, for all the different specifications. Specifications 4 to 9 include education and income. High-level education always increases inequality aversion higher income always reduces IA: this applies across all specifications. Health shocks reduce average health-inequality aversion. Similar results for health-inequality aversion in the UK in 2016 can be found in Table B2.

Results from alternative specifications for income-inequality aversion in the 2020 sample and the 2016 (UK) sample can be found in tables B3 and B4 respectively. Compared to the UK, income-inequality aversion is significantly higher in Germany, and the estimates are robust across different specifications. As with health-inequality aversion, income-inequality aversion is consistently lower among individuals under 25, and higher among individuals over 65. As with health-inequality aversion, we find no evidence of gender effects. Income and education effects are consistent with previous estimates for health-inequality aversion. Lower- income individuals are *more* inequality averse. In contrast, higher income individuals are less inequality averse. Major health shocks reduce income-inequality aversion. However, whilst income shocks do not modify inequality aversion estimates, permanent employment shocks reduce income-inequality aversion.

Table B1: Health IA – 2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age (reference: 25-64)									
<25		-0.0480***	-0.0355***	-0.0362***	-0.0294**	-0.0335**	-0.0322**	-0.0297**	-0.0283**
		(0.0124)	(0.0124)	(0.0134)	(0.0138)	(0.0137)	(0.0137)	(0.0140)	(0.0141)
65+		0.0219*	0.00841	0.00804	0.00724	0.0105	0.00661	0.00654	0.00694
		(0.0130)	(0.0130)	(0.0138)	(0.0138)	(0.0139)	(0.0141)	(0.0142)	(0.0142)
Gender (ref: female)									
Male		-0.0204**	-0.00838	-0.00742	-0.00559	-0.00590	-0.00868	-0.00714	-0.00671
		(0.00845)	(0.00847)	(0.00896)	(0.00905)	(0.00904)	(0.00906)	(0.00913)	(0.00917)
Education (ref: medium)									
low education				-0.0152	-0.0189	-0.0157	-0.0131	-0.0184	-0.0171
				(0.0160)	(0.0162)	(0.0162)	(0.0162)	(0.0164)	(0.0164)
high education				0.0419***	0.0429***	0.0429***	0.0415***	0.0418***	0.0416***
				(0.00977)	(0.00985)	(0.00985)	(0.00986)	(0.00992)	(0.00995)
Income (ref: medium)									
low income				0.0217**	0.0218**	0.0211**	0.0217**	0.0223**	0.0215**
				(0.0103)	(0.0105)	(0.0105)	(0.0105)	(0.0106)	(0.0106)
high income				-0.0274**	-0.0303**	-0.0285**	-0.0292**	-0.0307**	-0.0296**
				(0.0120)	(0.0121)	(0.0121)	(0.0121)	(0.0122)	(0.0122)
Risk aversion									
			0.155***	0.158***	0.154***	0.159***	0.156***	0.154***	0.156***
			(0.0166)	(0.0176)	(0.0178)	(0.0178)	(0.0178)	(0.0180)	(0.0181)
Country (ref: UK)									
Italy	-0.0412***	-0.0405***	-0.0367***	-0.0309***	-0.0303***	-0.0309***	-0.0300***	-0.0308***	-0.0317***
	(0.00942)	(0.00949)	(0.00943)	(0.0101)	(0.0102)	(0.0102)	(0.0102)	(0.0103)	(0.0103)
Germany	-0.0142	-0.0154	-0.0212*	-0.0168	-0.0165	-0.0146	-0.0154	-0.0152	-0.0144
	(0.0116)	(0.0116)	(0.0115)	(0.0125)	(0.0126)	(0.0126)	(0.0126)	(0.0127)	(0.0127)
Hlth. shock (ref:none)									
Minor shock					-0.0326**			-0.0318**	-0.0337**
					(0.0152)			(0.0154)	(0.0155)
Major shock					-0.0307*			-0.0319*	-0.0327*
					(0.0168)			(0.0171)	(0.0173)
Inc. shock (ref: none)									
Minor shock						0.0111			0.0238*
						(0.0105)			(0.0136)
Major shock						0.00808			0.0225
						(0.0118)			(0.0154)
Emp.shock (ref:none)									
Temp. shock							-0.00573	-0.00225	-0.0184
							(0.00951)	(0.00969)	(0.0132)
Perm. shock							0.00429	0.0111	-0.00645
							(0.0197)	(0.0200)	(0.0227)
Constant	0.546***	0.560***	0.470***	0.450***	0.456***	0.443***	0.453***	0.457***	0.454***
	(0.00658)	(0.00835)	(0.0126)	(0.0152)	(0.0155)	(0.0163)	(0.0167)	(0.0168)	(0.0169)
Observations	4,598	4,583	4,539	4,114	4,050	4,059	4,055	4,003	3,982
R-squared	0.004	0.009	0.028	0.036	0.038	0.036	0.036	0.038	0.039

Note: Correlates of health IA in Italy, Germany, and the UK. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table B2: Health IA – UK 2016

	(1)	(2)	(3)	(4)	(5)	(6)
Age (reference: 25-64)						
<25	-0.0150	-0.00199	-0.0206	-0.0225	-0.0205	-0.0217
	(0.0212)	(0.0214)	(0.0235)	(0.0237)	(0.0236)	(0.0238)
65+	-0.0143	-0.0223	-0.0227	-0.0221	-0.0220	-0.0205
	(0.0152)	(0.0152)	(0.0165)	(0.0166)	(0.0167)	(0.0167)
Gender (reference: female)						
Male	0.0290**	0.0424***	0.0388***	0.0379***	0.0378***	0.0372***
	(0.0122)	(0.0124)	(0.0131)	(0.0132)	(0.0131)	(0.0132)
Education level (reference: medium)						
low education			0.106**	0.107**	0.104**	0.107**
			(0.0413)	(0.0418)	(0.0417)	(0.0418)
high education			0.0443***	0.0457***	0.0456***	0.0465***
			(0.0135)	(0.0135)	(0.0135)	(0.0135)
Income level (reference: medium)						
low income			-0.0124	-0.0136	-0.0139	-0.0156
			(0.0174)	(0.0175)	(0.0175)	(0.0176)
high income			-0.0430***	-0.0435***	-0.0448***	-0.0444***
			(0.0154)	(0.0154)	(0.0154)	(0.0155)
Risk aversion (0-1 scale)						
		0.129***	0.126***	0.124***	0.128***	0.127***
		(0.0231)	(0.0244)	(0.0246)	(0.0246)	(0.0248)
Health shock (reference: none)						
Minor health shock				-0.0134		-0.0146
				(0.0177)		(0.0182)
Major health shock				-0.0172		-0.0167
				(0.0224)		(0.0230)
Income shock (reference: none)						
Minor income shock					-0.00805	-0.00233
					(0.0205)	(0.0210)
Major income shock					0.0140	0.0199
					(0.0278)	(0.0284)
Constant	0.441***	0.365***	0.357***	0.362***	0.357***	0.361***
	(0.00889)	(0.0161)	(0.0194)	(0.0201)	(0.0202)	(0.0206)
Observations	1,951	1,934	1,746	1,738	1,739	1,734
R-squared	0.003	0.019	0.027	0.028	0.028	0.029

Note: Correlates of health IA in Italy, Germany, and the UK. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table B3: Income IA – 2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age group (reference: 25-64)									
<25		-0.0495***	-0.0312**	-0.0360***	-0.0259*	-0.0336**	-0.0308**	-0.0243*	-0.0237*
		(0.0128)	(0.0128)	(0.0137)	(0.0141)	(0.0140)	(0.0140)	(0.0142)	(0.0143)
65+		0.0372***	0.0219*	0.0170	0.0173	0.0161	0.0146	0.0163	0.0154
		(0.0132)	(0.0131)	(0.0138)	(0.0139)	(0.0140)	(0.0141)	(0.0142)	(0.0142)
Gender (reference: female)									
Male		-0.0137	0.000188	0.00143	0.00243	0.00203	0.00238	0.00330	0.00270
		(0.00860)	(0.00856)	(0.00902)	(0.00909)	(0.00911)	(0.00911)	(0.00917)	(0.00921)
Education level (reference: medium)									
low education				-0.0201	-0.0223	-0.0221	-0.0198	-0.0229	-0.0235
				(0.0161)	(0.0163)	(0.0163)	(0.0162)	(0.0164)	(0.0165)
high education				0.0305***	0.0330***	0.0315***	0.0304***	0.0330***	0.0327***
				(0.00987)	(0.00994)	(0.00995)	(0.00994)	(0.01000)	(0.0100)
Income level (reference: medium)									
low income				0.0205**	0.0196*	0.0206*	0.0211**	0.0202*	0.0196*
				(0.0104)	(0.0105)	(0.0106)	(0.0105)	(0.0106)	(0.0107)
high income				-	-	-	-	-	-

				0.0341***	0.0346***	0.0338***	0.0363***	0.0357***	0.0347***
				(0.0121)	(0.0122)	(0.0122)	(0.0122)	(0.0122)	(0.0123)
Risk aversion (0-1 scale)									
			0.211***	0.218***	0.212***	0.216***	0.213***	0.210***	0.210***
			(0.0168)	(0.0177)	(0.0178)	(0.0179)	(0.0179)	(0.0180)	(0.0181)
	Country (reference: UK)								
Italy		-0.0151	-0.0135	-0.00770	0.00403	0.00554	0.00442	0.00608	0.00599	0.00467
		(0.00963)	(0.00969)	(0.00958)	(0.0102)	(0.0103)	(0.0103)	(0.0103)	(0.0104)	(0.0104)
	Germany	0.0543***	0.0517***	0.0452***	0.0453***	0.0461***	0.0471***	0.0467***	0.0475***	0.0486***
		(0.0117)	(0.0117)	(0.0116)	(0.0125)	(0.0126)	(0.0126)	(0.0126)	(0.0127)	(0.0127)
	Health shock (reference: none)									
Minor health shock						-0.0246			-0.0230	-0.0237
						(0.0154)			(0.0156)	(0.0157)
	Major health shock					-0.0463***			-0.0443**	-0.0437**
						(0.0172)			(0.0176)	(0.0178)
	Income shock (reference: none)									
Minor income shock							0.00898			0.0217
							(0.0106)			(0.0136)
	Major income shock						8.04e-05			0.0218
							(0.0120)			(0.0155)
	Employment shock (reference: none)									
Temporary employment shock								-0.00577	-0.000393	-0.0157
								(0.00956)	(0.00973)	(0.0132)
	Permanent employment shock							-0.0374*	-0.0278	-0.0417*
								(0.0200)	(0.0203)	(0.0229)
Constant		0.579***	0.588***	0.466***	0.450***	0.456***	0.448***	0.456***	0.458***	0.457***
		(0.00671)	(0.00851)	(0.0128)	(0.0153)	(0.0156)	(0.0164)	(0.0168)	(0.0169)	(0.0170)
Observations		4,811	4,796	4,751	4,296	4,234	4,238	4,237	4,186	4,163
R-squared		0.007	0.013	0.045	0.053	0.054	0.052	0.053	0.055	0.055

Note: Correlates of income-IA in Italy, Germany, and the UK. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table B4: Income IA – UK 2016

	(1) Income IA	(2) Income IA	(3) Income IA	(4) Income IA	(5) Income IA	(6) Income IA
Age group (reference: 25-64)						
<25	-0.00142	0.0202	0.000734	0.000788	0.00266	0.00330
	(0.0215)	(0.0216)	(0.0236)	(0.0238)	(0.0237)	(0.0239)
65+	-0.0178	-0.0298**	-0.0292*	-0.0293*	-0.0292*	-0.0276*
	(0.0153)	(0.0152)	(0.0164)	(0.0165)	(0.0166)	(0.0167)
Gender (reference: female)						
Male	0.00474	0.0249**	0.0251*	0.0240*	0.0241*	0.0235*
	(0.0123)	(0.0124)	(0.0131)	(0.0131)	(0.0131)	(0.0131)
Education level (reference: medium)						
low education			0.0933**	0.0953**	0.0914**	0.0944**
			(0.0408)	(0.0412)	(0.0412)	(0.0413)
high education			0.0437***	0.0454***	0.0441***	0.0453***
			(0.0134)	(0.0135)	(0.0135)	(0.0135)
Income level (reference: medium)						
low income			0.0191	0.0185	0.0177	0.0166
			(0.0174)	(0.0175)	(0.0175)	(0.0176)

high income			-0.0547***	-0.0562***	-0.0564***	-0.0566***
			(0.0153)	(0.0154)	(0.0154)	(0.0154)
Risk aversion (0-1 scale)						
		0.184***	0.188***	0.183***	0.188***	0.185***
		(0.0231)	(0.0244)	(0.0246)	(0.0247)	(0.0248)
Health shock (reference: none)						
Minor health shock				-0.0296*		-0.0309*
				(0.0178)		(0.0182)
Major health shock				-0.0393*		-0.0419*
				(0.0223)		(0.0229)
Income shock (reference: none)						
Minor income shock					-0.0123	-0.00259
					(0.0204)	(0.0209)
Major income shock					0.00783	0.0207
					(0.0277)	(0.0283)
Constant	0.530***	0.421***	0.407***	0.418***	0.409***	0.418***
	(0.00898)	(0.0162)	(0.0194)	(0.0201)	(0.0202)	(0.0206)
Observations	1,943	1,927	1,743	1,735	1,735	1,730
R-squared	0.001	0.033	0.047	0.050	0.047	0.050
	(1)	(2)	(3)	(4)	(5)	(6)

Note: Correlates of income-IA in Italy, Germany, and the UK. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix C: DiD regressions

Tables C1 to C8 all refer to DiD analysis carried out the UK samples in 2016 and 2020 to provide additional supporting detail for the estimates summarised Table 4 and to report on alternative variants of the model. Tables C1 to C4 report the DID estimates for γ^h (IA in the health dimension) and Tables C5 to C8 report the DID estimates for γ^y (IA in the income dimension).

Tables C1 and C5 report the estimates for the simplest variants of the DiD model. These variants are without conditioning covariates and with single-source vulnerability. They also set either the shock indicator s_{it} or the vulnerability indicator v_{it} to be inactive (see equation 2).

Tables C2 and C6 report the DiD estimates with multi-source vulnerability, Tables C3 and C7 report simple DiD with single-source vulnerability and conditioning covariates, and finally Tables C4 and C8 rep ort DiD with multi-source vulnerability and conditioning covariates.

Table C1: γ^h DiD without conditioning covariates, single-source vulnerability

	(1)	(2)	(3)	(4)	(5)	(6)
Year = 2020			0.100***	0.0932***	0.0995***	0.100***
	(0.0113)	(0.00983)	(0.00932)	(0.0100)	0.0931***	0.0849***
High regional risk	0.0166				(0.00958)	(0.0110)
	(0.0130)					
2020 x High regional risk	-0.0122					
	(0.0185)					
High age-based risk		-0.00904				
		(0.0155)				
2020 x High age-based risk		0.0161				
		(0.0239)				
Serious health shock			-0.0227			
			(0.0216)			
2020 x Serious health shock			-0.0527			
			(0.0326)			
Minor or serious health shock				-0.0217		
				(0.0145)		
2020 x Minor or serious health shock				-0.0372*		
				(0.0224)		
Serious income shock					0.0131	
2020 x Serious income shock					(0.0275)	
					0.00577	
Minor or serious income shock					(0.0319)	
						-0.000562
2020 x Minor or serious income shock						(0.0168)
						0.0248
Constant	0.444***	0.452***	0.452***	0.455***		(0.0211)
	(0.00787)	(0.00704)	(0.00658)	(0.00721)	0.449***	0.450***
Observations	3,846	3,846	3,846	3,846	(0.00645)	(0.00687)
R-squared	0.030	0.029	0.032	0.033	3,846	3,846

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table C2: γ^h DiD without conditioning covariates, multiple-source vulnerability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year = 2020	0.0993***	0.0936***	0.0941***	0.0971***	0.0943***	0.0996***	0.0955***	0.0952***
	(0.00918)	(0.00898)	(0.00896)	(0.00908)	(0.00919)	(0.00902)	(0.00895)	(0.00894)
High regional and age risk	0.0581**							
	(0.0262)							
2020 * High regional and age risk	-0.0516							
	(0.0395)							
Health shock and high age risk		-0.0474						
		(0.0472)						
2020 * Health shock and high age risk		0.239***						
		(0.0840)						
Income shock and high age risk			-0.0796					
			(0.113)					
2020 * Income shock and high age risk			0.234*					
			(0.128)					
Health shock and high				-0.0518				

regional risk								
				(0.0344)				
2020 * Health shock and high regional risk				-0.0329				
				(0.0494)				
Income shock and high regional risk					-0.0192			
					(0.0437)			
2020 * Income shock and high regional risk					0.0351			
					(0.0492)			
Income shock and health shock						-0.0841*		
						(0.0485)		
2020 * Income shock and health shock						-0.0695		
						(0.0604)		
Health shock and high regional and age risk							0.0366	
							(0.0981)	
2020 * Health shock and high regional and age risk							0.141	
							(0.139)	
Income shock and high regional and age risk								0.106
								(0.196)
2020 * Income shock and high regional and age risk								0.159
								(0.222)
Constant	0.446***	0.451***	0.450***	0.451***	0.450***	0.451***	0.450***	0.450***
	(0.00647)	(0.00632)	(0.00628)	(0.00638)	(0.00634)	(0.00631)	(0.00628)	(0.00627)
Observations	3,846	3,846	3,846	3,846	3,846	3,846	3,846	3,846
R-squared	0.030	0.031	0.031	0.031	0.029	0.035	0.030	0.031

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table C3: γ^h DiD with conditioning covariates, single-source vulnerability

	(1)	(2)	(3)	(4)	(5)	(6)
Age group (reference: 25-64)						
<25	-0.0395***	-0.0395***	-0.0354**	-0.0351**	-0.0406***	-0.0417***
	(0.0144)	(0.0145)	(0.0145)	(0.0145)	(0.0145)	(0.0144)
65+	-0.0156	-0.0194	-0.0163	-0.0164	-0.0151	-0.0145
	(0.0128)	(0.0167)	(0.0128)	(0.0128)	(0.0128)	(0.0129)
Gender (reference: female)						
Male	-0.000202	0.000153	0.000491	0.000847	-0.000305	5.82e-05
	(0.00949)	(0.00951)	(0.00949)	(0.00950)	(0.00951)	(0.00949)
Education level (reference: medium)						
low education	-0.00690	-0.00673	-0.00526	-0.00298	-0.00473	-0.00483
	(0.0240)	(0.0241)	(0.0240)	(0.0240)	(0.0240)	(0.0240)
high education	0.0586***	0.0588***	0.0583***	0.0589***	0.0589***	0.0595***
	(0.00978)	(0.00979)	(0.00978)	(0.00978)	(0.00979)	(0.00979)
Income level (reference: medium)						
low income	-0.00445	-0.00413	-0.00497	-0.00423	-0.00428	-0.00283
	(0.0119)	(0.0119)	(0.0119)	(0.0119)	(0.0119)	(0.0119)
high income	-0.0399***	-0.0396***	-0.0393***	-0.0389***	-0.0389***	-0.0387***
	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)
Risk attitude (reference: moderate)						
extremely risk loving	0.125***	0.124***	0.122***	0.120***	0.125***	0.126***
	(0.0182)	(0.0182)	(0.0182)	(0.0183)	(0.0183)	(0.0183)
extremely risk averse	0.108***	0.0993***	0.103***	0.104***	0.0976***	0.0862***
	(0.0119)	(0.0103)	(0.00983)	(0.0105)	(0.0101)	(0.0116)

Year = 2020	0.0227*					
	(0.0137)					
High regional risk	-0.0210					
	(0.0192)					
2020 * High regional risk		-				
2020 * High age-based risk (65+)		0.00640				
		(0.0252)				
Serious health shock			-0.0140			
			(0.0229)			
2020 * Serious health shock			-0.0477			
			(0.0340)			
Minor or serious health shock				-0.0153		
				(0.0152)		
2020 * Minor or serious health shock				-0.0327		
				(0.0233)		
Serious income shock					0.0150	
					(0.0284)	
2020 * Serious income shock					0.00427	
					(0.0328)	
Minor or serious income shock						-0.000862
						(0.0177)
2020 * Minor or serious income shock						0.0314
						(0.0220)
Constant	0.362***	0.371***	0.372***	0.375***	0.368***	0.368***
	(0.0160)	(0.0153)	(0.0153)	(0.0158)	(0.0154)	(0.0157)
Observations	3,494	3,494	3,494	3,494	3,494	3,494
R-squared	0.059	0.058	0.060	0.060	0.058	0.059

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table C4: γ^h DiD with conditioning covariates, multiple-source vulnerability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age group (reference: 25-64)								
<25	-0.0403***	-0.0392***	-0.0392***	-0.0365**	-0.0398***	-0.0333**	-0.0395***	-0.0396***
	(0.0144)	(0.0144)	(0.0144)	(0.0145)	(0.0145)	(0.0145)	(0.0144)	(0.0144)
65+	-0.0317**	-0.0202	-0.0204	-0.0165	-0.0165	-0.0185	-0.0194	-0.0185
	(0.0149)	(0.0132)	(0.0130)	(0.0128)	(0.0128)	(0.0128)	(0.0129)	(0.0128)
Gender (reference: female)								
Male	-0.000495	0.000183	-0.000341	0.000352	-2.20e-05	0.000805	9.21e-05	9.00e-05
	(0.00949)	(0.00949)	(0.00949)	(0.00949)	(0.00951)	(0.00947)	(0.00949)	(0.00949)
Education level (reference: medium)								
low education	-0.00582	-0.00855	-0.00703	-0.00407	-0.00604	-0.00603	-0.00956	-0.00565
	(0.0241)	(0.0240)	(0.0240)	(0.0241)	(0.0240)	(0.0240)	(0.0241)	(0.0240)
high education	0.0592***	0.0591***	0.0589***	0.0587***	0.0587***	0.0575***	0.0588***	0.0585***
	(0.00978)	(0.00978)	(0.00978)	(0.00978)	(0.00979)	(0.00977)	(0.00978)	(0.00979)
Income level (reference: medium)								
low income	-0.00362	-0.00363	-0.00422	-0.00491	-0.00397	-0.00427	-0.00279	-0.00449
	(0.0119)	(0.0119)	(0.0119)	(0.0119)	(0.0120)	(0.0119)	(0.0119)	(0.0119)
high income	-0.0393***	-0.0397***	-0.0399***	-0.0391***	-0.0394***	-0.0402***	-0.0392***	-0.0398***
	(0.0113)	(0.0113)	(0.0114)	(0.0114)	(0.0114)	(0.0113)	(0.0114)	(0.0114)
Risk attitude								

(reference: moderate)								
extremely risk loving	0.124***	0.123***	0.125***	0.123***	0.124***	0.119***	0.123***	0.124***
	(0.0182)	(0.0182)	(0.0182)	(0.0182)	(0.0183)	(0.0182)	(0.0182)	(0.0182)
extremely risk averse	0.104***	0.0981***	0.0984***	0.102***	0.1000***	0.103***	0.1000***	0.0998***
	(0.00970)	(0.00950)	(0.00948)	(0.00962)	(0.00972)	(0.00954)	(0.00947)	(0.00946)
Year = 2020	0.104***	0.0981***	0.0984***	0.102***	0.1000***	0.103***	0.1000***	0.0998***
	(0.00970)	(0.00950)	(0.00948)	(0.00962)	(0.00972)	(0.00954)	(0.00947)	(0.00946)
High regional and age risk	0.0833***							
	(0.0306)							
2020 * High regional and age risk	-0.0762*							
	(0.0413)							
Health shock and high age risk		-0.0234						
		(0.0523)						
2020 * Health shock and high age risk		0.206**						
		(0.0876)						
Income shock and high age risk			-0.0966					
			(0.123)					
2020 * Income shock and high age risk			0.249*					
			(0.140)					
Health shock and high regional risk				-0.0230				
				(0.0361)				
2020 * Health shock and high regional risk				-0.0531				
				(0.0510)				
Income shock and high regional risk					0.000815			
					(0.0441)			
2020 * Income shock and high regional risk					0.00343			
					(0.0498)			
Income shock and health shock						-0.103**		
						(0.0523)		
2020 * Income shock and health shock						-0.0371		
						(0.0638)		
Health shock and high regional and age risk							0.124	
							(0.113)	
2020 * Health shock and high regional and age risk							0.0144	
							(0.153)	
Income shock and high regional and age risk								0.139
								(0.274)
2020 * Income shock and high regional and age risk								0.0444
								(0.300)
Constant	0.368***	0.371***	0.371***	0.371***	0.370***	0.375***	0.370***	0.371***
	(0.0152)	(0.0151)	(0.0151)	(0.0152)	(0.0152)	(0.0151)	(0.0151)	(0.0151)
Observations	3,494	3,494	3,494	3,494	3,494	3,494	3,494	3,494
R-squared	0.060	0.060	0.060	0.059	0.058	0.063	0.059	0.059

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table C5: γ^y DiD without conditioning covariates, single-source vulnerability

	(1)	(2)	(3)	(4)	(5)	(6)
Year = 2020	0.0458***	0.0458***	0.0522***	0.0521***	0.0512***	0.0444***
	(0.0114)	(0.00998)	(0.00943)	(0.0101)	(0.00969)	(0.0112)
High regional risk	-0.000264					
	(0.0134)					
2020 * High regional risk	0.0136					
	(0.0187)					
High age based risk		-0.0171				
		(0.0159)				
2020 * High age based risk		0.0279				
		(0.0240)				
Serious health shock			-0.0355			
			(0.0220)			
2020 * Serious health shock			-0.0325			
			(0.0335)			
Minor or serious health shock				-0.0332**		
				(0.0149)		
2020 * Minor or serious health shock				-0.0262		
				(0.0229)		
Serious income shock					0.00475	
					(0.0282)	
2020 * Serious income shock					-0.00462	
					(0.0325)	
Minor or serious income shock						-0.00442
						(0.0172)
2020 * Minor or serious income shock						0.0171
						(0.0214)
Constant	0.528***	0.532***	0.532***	0.536***	0.528***	0.529***
	(0.00806)	(0.00721)	(0.00674)	(0.00739)	(0.00661)	(0.00704)
Observations	3,916	3,916	3,916	3,916	3,916	3,916
R-squared	0.008	0.008	0.011	0.012	0.008	0.008

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table C6: γ^y DiD without conditioning covariates, multiple-source vulnerability

	(1) γ^y	(2) γ^y	(3) γ^y	(4) γ^y	(5) γ^y	(6) γ^y	(7) γ^y	(8) γ^y
Year = 2020	0.0508***	0.0484***	0.0505***	0.0505***	0.0499***	0.0533***	0.0499***	0.0508***
	(0.00931)	(0.00911)	(0.00909)	(0.00920)	(0.00931)	(0.00915)	(0.00907)	(0.00906)
High regional and age risk	0.0162							
	(0.0268)							
2020 * High regional and age risk	0.00718							
	(0.0398)							
Health shock and high age risk		-0.0765*						
		(0.0464)						
2020 * Health shock and high age risk		0.200**						
		(0.0848)						
Income shock and high age risk			-0.0655					
			(0.116)					
2020 * Income shock and high age risk			0.0856					
			(0.130)					
Health shock and high regional risk				-0.0834**				
				(0.0349)				
2020 * Health shock and high regional risk				0.00521				
				(0.0501)				
Income shock and high regional risk					-0.0579			
					(0.0447)			

2020 * Income shock and high regional risk					0.0554			
					(0.0501)			
Income shock and health shock						-0.0647		
						(0.0497)		
2020 * Income shock and health shock						-0.0480		
						(0.0618)		
Health shock and high regional and age risk							-0.129	
							(0.0898)	
2020 * Health shock and high regional and age risk							0.217	
							(0.135)	
Income shock and high regional and age risk								-0.0839
								(0.200)
2020 * Income shock and high regional and age risk								0.0920
								(0.227)
Constant	0.527***	0.530***	0.528***	0.531***	0.529***	0.529***	0.529***	0.528***
	(0.00663)	(0.00648)	(0.00643)	(0.00653)	(0.00649)	(0.00647)	(0.00644)	(0.00643)
Observations	3,916	3,916	3,916	3,916	3,916	3,916	3,916	3,916
R-squared	0.008	0.009	0.008	0.011	0.008	0.011	0.009	0.008

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table C7 γ^y: DiD with conditioning covariates, single-source vulnerability

	(1)	(2)	(3)	(4)	(5)	(6)
Age group (reference: 25-64)						
<25	-0.0304**	-0.0287*	-0.0264*	-0.0253*	-0.0295**	-0.0303**
	(0.0147)	(0.0147)	(0.0147)	(0.0147)	(0.0147)	(0.0147)
65+	-0.0216*	-0.0272	-0.0215*	-0.0216*	-0.0208	-0.0202
	(0.0128)	(0.0170)	(0.0128)	(0.0127)	(0.0128)	(0.0129)
Gender (reference: female)						
Male	-0.00885	-0.00841	-0.00860	-0.00824	-0.00874	-0.00871
	(0.00952)	(0.00954)	(0.00952)	(0.00952)	(0.00953)	(0.00952)
Education level (reference: medium)						
low education	0.00116	-0.000179	0.00282	0.00433	0.00156	0.00198
	(0.0242)	(0.0243)	(0.0242)	(0.0242)	(0.0242)	(0.0242)
high education	0.0546***	0.0548***	0.0547***	0.0555***	0.0550***	0.0553***
	(0.00981)	(0.00981)	(0.00981)	(0.00980)	(0.00982)	(0.00981)
Income level (reference: medium)						
low income	0.0113	0.0105	0.00972	0.0103	0.0104	0.0115
	(0.0120)	(0.0120)	(0.0120)	(0.0120)	(0.0120)	(0.0120)
high income	-	-	-	-	-	-
	0.0443***	0.0447***	0.0446***	0.0443***	0.0441***	0.0439***
	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)
Risk attitude (reference: moderate)						
extremely risk loving	0.195***	0.194***	0.192***	0.190***	0.196***	0.196***
	(0.0183)	(0.0183)	(0.0183)	(0.0184)	(0.0184)	(0.0184)
extremely risk averse						
	0.0433***	0.0475***	0.0495***	0.0477***	0.0484***	0.0387***
	(0.0119)	(0.0104)	(0.00985)	(0.0106)	(0.0101)	(0.0116)
Year = 2020	0.00113					
	(0.0139)					
High regional risk	0.0164					
	(0.0193)					
2020 * High regional risk		-				
2020 * High age based risk (65+)		0.0121				
		(0.0251)				
Serious health shock			-0.0324			
			(0.0231)			
2020 * Serious health shock			-0.0113			
			(0.0345)			
Minor or serious health shock				-0.0323**		

				(0.0155)		
2020 * Minor or serious health shock				-0.00758		
				(0.0236)		
Serious income shock					0.0133	
					(0.0288)	
2020 * Serious income shock					-0.00316	
					(0.0331)	
Minor or serious income shock						-0.00223
						(0.0179)
2020 * Minor or serious income shock						0.0249
						(0.0221)
Constant	0.416***	0.417***	0.420***	0.426***	0.414***	0.415***
	(0.0161)	(0.0154)	(0.0154)	(0.0158)	(0.0154)	(0.0158)
Observations	3,569	3,569	3,569	3,569	3,569	3,569
R-squared	0.055	0.055	0.056	0.057	0.055	0.056

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table C8: γ^y DiD with conditioning covariates, multiple-source vulnerability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age group (reference: 25-64)								
<25	-0.0291**	-0.0286*	-0.0290**	-0.0264*	-0.0292**	-0.0257*	-0.0290**	-0.0291**
	(0.0146)	(0.0146)	(0.0146)	(0.0147)	(0.0147)	(0.0147)	(0.0146)	(0.0146)
65+	-0.0319**	-0.0217*	-0.0217*	-0.0221*	-0.0221*	-0.0230*	-0.0217*	-0.0211
	(0.0149)	(0.0132)	(0.0130)	(0.0128)	(0.0128)	(0.0128)	(0.0129)	(0.0128)
Gender (reference: female)								
Male	-0.00873	-0.00834	-0.00876	-0.00833	-0.00901	-0.00826	-0.00853	-0.00885
	(0.00953)	(0.00952)	(0.00952)	(0.00952)	(0.00953)	(0.00952)	(0.00952)	(0.00952)
Education level (reference: medium)								
low education	7.15e-05	-0.000319	0.000613	0.00451	0.00115	0.00200	0.00120	0.000639
	(0.0242)	(0.0242)	(0.0242)	(0.0242)	(0.0242)	(0.0242)	(0.0242)	(0.0242)
high education	0.0550***	0.0552***	0.0546***	0.0552***	0.0548***	0.0543***	0.0550***	0.0548***
	(0.00981)	(0.00980)	(0.00981)	(0.00980)	(0.00981)	(0.00980)	(0.00981)	(0.00981)
Income level (reference: medium)								
low income	0.0109	0.0105	0.0106	0.0105	0.0114	0.0102	0.0107	0.0111
	(0.0120)	(0.0120)	(0.0120)	(0.0120)	(0.0120)	(0.0120)	(0.0120)	(0.0120)
high income	-	-	-	-	-	-	-	-
	0.0445***	0.0447***	0.0447***	0.0444***	0.0445***	0.0450***	0.0448***	0.0443***
	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)
Risk attitude (reference: moderate)								
extremely risk loving	0.194***	0.194***	0.195***	0.193***	0.194***	0.192***	0.194***	0.194***
	(0.0183)	(0.0183)	(0.0183)	(0.0183)	(0.0184)	(0.0183)	(0.0183)	(0.0183)
extremely risk averse	0.0496***	0.0472***	0.0490***	0.0480***	0.0482***	0.0510***	0.0487***	0.0494***
	(0.00974)	(0.00952)	(0.00951)	(0.00964)	(0.00974)	(0.00958)	(0.00950)	(0.00949)
Year = 2020	0.0496***	0.0472***	0.0490***	0.0480***	0.0482***	0.0510***	0.0487***	0.0494***
	(0.00974)	(0.00952)	(0.00951)	(0.00964)	(0.00974)	(0.00958)	(0.00950)	(0.00949)
High regional and age risk	0.0352							
	(0.0308)							
2020 * High regional and age risk	-0.00665							
	(0.0412)							
Health shock and high age risk		-0.0693						
		(0.0514)						
2020 * Health shock and high age risk		0.198**						
		(0.0860)						
Income shock and high age risk			-0.0964					
			(0.125)					
2020 * Income shock and high age risk			0.118					
			(0.139)					
Health shock and high regional risk				-0.0769**				

				(0.0360)				
2020 * Health shock and high regional risk				0.0323				
				(0.0509)				
Income shock and high regional risk					-0.0389			
					(0.0447)			
2020 * Income shock and high regional risk					0.0432			
					(0.0503)			
Income shock and health shock						-0.0618		
						(0.0531)		
2020 * Income shock and health shock						-0.0260		
						(0.0648)		
Health shock and high regional and age risk							-0.0962	
							(0.0992)	
2020 * Health shock and high regional and age risk							0.183	
							(0.139)	
Income shock and high regional and age risk								-0.292
								(0.278)
2020 * Income shock and high regional and age risk								0.272
								(0.300)
Constant	0.416***	0.417***	0.416***	0.419***	0.417***	0.419***	0.417***	0.416***
	(0.0152)	(0.0152)	(0.0152)	(0.0152)	(0.0153)	(0.0153)	(0.0152)	(0.0152)
Observations	3,569	3,569	3,569	3,569	3,569	3,569	3,569	3,569
R-squared	0.055	0.056	0.055	0.056	0.055	0.057	0.055	0.055

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1