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THE UNEQUAL CONSEQUENCES OF THE COVID-19 PANDEMIC: EVIDENCE FROM A LARGE REPRESENTATIVE GERMAN POPULATION SURVEY

BY LEA IMMEL

ifo Institute and University of Munich

AND

FLORIAN NEUMEIER and ANDREAS PEICHL*

ifo Institute, University of Munich and CESifo

We use panel data from three waves of a large representative population survey carried out between June and November 2020 to assess in what regards and to what extent different groups of the German population are affected by the COVID-19 crisis. Using common factor analysis, we show that people's lives are mainly affected in two ways: First, a notable fraction of the population is concerned that they or their family members and friends may get infected with the coronavirus. Second, many people suffer from socio-economic consequences of the crisis, including a discontinuation of employment, a decrease in household income, and worries about financial troubles. Regressing these two factors on several socio-demographic characteristics reveals that especially the socio-economic consequences vary across population groups. Self-employed persons, marginally employed workers, low-income households, and families with children appear to be burdened overproportionally.

JEL Codes: I10, I14, I18, J11, J20

Keywords: corona, COVID-19, crisis, pandemic, inequality, Germany

1. INTRODUCTION

In 2020, the COVID-19 pandemic quickly spread across the globe and presented unprecedented challenges to societies in dealing with its health, social, and economic consequences. To contain the spread of the pandemic, governments around the world implemented measures that severely disrupted economic and social life, including contact restrictions, curfews, as well as the closure of businesses, schools, public facilities, and the prohibition of mass events. These interventions as well as the pandemic itself affect people's lives in different ways: their

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*Correspondence to: Andreas Peichl, ifo Institute, Leibniz Institute for Economic Research, University of Munich e.V., Poschingerstr. 5, Munich D-81679, Germany (peichl@ifo.de).

physical and mental health, working lives and economic situation, economic security, educational careers, and social relationships, among others.

This paper pursues three goals: First, we aim to shed light on the question how and in what dimensions the COVID-19 pandemic affects people's lives. Second, we analyze whether different groups of society have been affected by the consequences of the pandemic more severely than others, a question that is up to date understudied in the literature. Third, we want to assess whether the extent to which these different subgroups were affected by the pandemic varies over its course. To this end, we use data from a self-designed panel survey of German households carried out at three points in time in 2020. The survey includes a series of questions eliciting how survey respondents were affected by the pandemic. More precisely, the survey elicits how the spread of the COVID-19 pandemic has affected the German population economically, socially, and emotionally. The sample comprises about 30,000 representatively selected persons aged 18 or above who were surveyed in three waves at different phases of the pandemic. The first survey wave took place in June 2020 during a period of low infection rates and relaxing restrictions. The second survey wave was carried out in October 2020 at a time when infection rates rose sharply. The third survey wave was conducted in November 2020 shortly after new restrictions on public and private life had been introduced.

The survey contains ten items eliciting whether, in which regard, and to what extent respondents were affected by the COVID-19 pandemic and the containment measures imposed by the German government. For instance, the respondents were asked whether they or their family members were tested positive for the coronavirus, whether they were released from their job as a consequence of the COVID-19 crisis, whether the pandemic affected their household income, how stressful they perceive the restrictions of public life to be, and how their social contacts have changed. In a first step, we apply common factor analysis to identify in what regards people are mainly affected by the pandemic based on common variation in these items. In a second step, we regress the factors we retrieve on a number of socio-demographic characteristics to draw conclusions about the differential impact of the pandemic by population groups.

The results of the factor analysis suggest that the consequences the pandemic has on people's lives can be summarized by two common factors: The first factor is related to respondents' concerns that they or their family members get infected. The second factor is related to burdens due to restrictions on public life and contacts, job loss, a decrease in household income, and financial concerns. Consequently, we label the first factor *Concern about Infection* and the second one *Socio-Economic Strain*.

Regressing these two common factors on socio-demographic and household characteristics reveals that the COVID-19 crisis has indeed differential effects on different population groups—with regard to both the intensity with and the dimensions in which people are affected. In particular, we find that women are more affected by the pandemic than men. In all three survey waves, they are more concerned about infections and also suffer from the adverse socio-economic consequences of the pandemic to a greater extent.

Two concerning findings are that socio-economic strain is inversely related to household income and that the adverse economic effects are larger for families with

children. These findings indicate that vulnerable groups are affected more severely by the economic consequences of the crisis. By far the largest economic burden in all three survey waves, however, is born by the self-employed, followed by manual workers. Nevertheless, their burden substantially decreases over time, i.e., from the first wave in June to the waves in October and November. On the contrary, both the self-employed and manual workers are significantly less concerned about infections than other occupation groups.

In our sample, older survey participants become less concerned about infections the longer the pandemic lasts. For example, individuals over 50 are the most concerned about infections in June 2020 while by October they were even less concerned than younger age groups. In addition, we find that respondents living in semi-detached houses or apartment buildings are more concerned about infections than respondents living in detached houses, whereas respondents with children in the household as well as respondents living in East Germany are less concerned.

Finally, in an extension of our analysis, we examine additional variables available in our data which describe how survey participants were affected by the pandemic, but were excluded from the factor analysis as they are only available in one or two survey waves. Here, we find that a majority of survey participants perceived the quality of their relationship with friends and family members to have remained unchanged during the pandemic, but the share of respondents feeling that their relationships have worsened increases as the pandemic progresses. Moreover, over 30 percent of respondents who have suffered an income loss since the beginning of the COVID-19 crisis were forced to take out a loan, borrow money, use up their savings, failed to pay bills/rent, or filed for private insolvency. In addition, 6 percent of all survey participants stated that they have postponed a large purchase/expense due to COVID-19. All these changes are correlated with the *Socio-Economic Strain* of the pandemic but unrelated to *Concern about Infection*.

Our paper relates to a quickly expanding literature on the socio-economic consequences of the COVID-19 pandemic and the policy measures taken to contain it. COVID-19, social distancing, and lockdown measures have been shown to affect labor markets (e.g. Adams-Prassl *et al*., 2020; Béland *et al*., 2020; Cajner *et al*., 2020; Coibion *et al*., 2020; Forsythe *et al*., 2020; Rojas *et al*., 2020; Hensvik *et al*., 2021), health and well-being (e.g. Goldstein and Lee, 2020; Lin and Meissner, 2020; Hamermesh, 2020; Brodeur *et al*., 2021; Fetzer *et al*., 2021), as well as (gender and racial) inequality (e.g. Alon *et al*., 2020; Blundell *et al*., 2020).

Moreover, recent work analyzes the differential impact of the COVID-19 crisis on population subgroups. For instance, Adams-Prassl *et al*. (2020) analyze the unequal impact of the pandemic on job and income losses using real-time surveys from the UK, US, and Germany. The authors report that the consequences of the COVID-19 crisis differ notably both across and within those three countries. According to their results, employees in Germany are less affected by the pandemic than those in the UK and the US. That is, by April 2020, only 5 percent of German employees who participated in the survey reported that they lost their job due to the corona pandemic. In the UK and the US, the share was 17 percent and 20 percent, respectively. In all three countries, workers in alternative work arrangements as well as workers who can only do a small share of tasks from home were more likely to lose their jobs and to suffer from a decrease in income. The same is true for

women as well as people without tertiary education. Similarly, Montenovo *et al*. (2020) study the socio-demographic ramifications of the pandemic on employment outcomes using US survey data. They document greater declines in employment for Hispanics, younger workers, as well as workers with a high school degree and show that job losses are more likely in occupations that require more interpersonal contact and cannot be performed remotely.

In general, studies find that the effects of the COVID-19 pandemic on labor market outcomes are more severe for women (Adams-Prassl *et al*., 2020; Alon *et al*., 2020; Montenovo *et al*., 2020), the less educated (Adams-Prassl *et al*., 2020; Béland *et al*., 2020; Benzeval *et al*., 2020; Cortes, 2020; Gupta *et al*., 2020; Montenovo *et al*., 2020; Mongey *et al*., 2020; Yasenov, 2020), younger workers (Adams-Prassl *et al*., 2020; Yasenov, 2020; Cortes, 2020; Béland *et al*., 2020), immigrants (Béland *et al*., 2020; Borjas *et al*., 2020; Fairlie *et al*., 2020; Montenovo *et al*., 2020; Yasenov, 2020), the financially vulnerable/ poor (Alstadsæter *et al*., 2020; Benzeval *et al*., 2020; Cortes and Forsythe, 2020; Mongey *et al*., 2020), parents (Alstadsæter *et al*., 2020), as well as for workers unable to work remotely (Béland *et al*., 2020; Cortes and Forsythe, 2020; Mongey *et al*., 2020) or workers in non-essential industries (Gupta *et al*., 2020).

The COVID-19 pandemic does not only have heterogeneous effects on labor market outcomes but also differs in its effects on (mental) health outcomes and well-being across population groups. Using Canadian survey data, Beland *et al*. (2020) show that women and less educated workers are more likely to report lower levels of mental health. Moreover, the authors find that those who were absent from work due to COVID-19 are more concerned about their financial obligations and about losing their job. Etheridge and Spantig (2020) study the effect of COVID-19 on mental well-being in the UK. They document that declines in well-being during the pandemic are related to family responsibilities, financial circumstances, and vary with age, where the young are more severely affected than the old. Similarly, studying parental well-being during the COVID-19 crisis in Germany, Huebener *et al*. (2021) find that the crisis lowered the relative well-being of individuals with children. Furthermore, their results suggest that the effects were largest for individuals with young children, for women, and for individuals with lower secondary education.

We contribute to this literature in at least two important ways. First, we use an unprecedented large number of variables indicating in what regards and to what extent people are affected by the COVID-19 crisis. Second, our large and representative survey was carried out in three waves at different points in time characterized by different infection dynamics. This allows us to study how people's lives were affected over the course of the pandemic. Other studies, in contrast, typically rely on data collected only at one point in time.

The rest of this paper is organized as follows. Section 2 provides background on the spread of the COVID-19 pandemic in Germany as well as on our survey. Section 3 presents a descriptive analysis of the answers given to the survey questions on how respondents were affected by the pandemic. We explain our estimation strategy in Section 4 and present our main results in Section 5. In Section 6, we test the robustness of our results. Section 7 extends the analysis, and Section 8 concludes.

2. Background

We start this paper by providing some background information about our survey and the situation in Germany at the time it was carried out. Section 2.1 summarizes the German experience with the spread and the containment of COVID-19 in 2020. Section 2.2 provides details on our survey and data set.

2.1. *COVID-19 in Germany 2020*

In 2020, the COVID-19 pandemic held Germany firmly in its grip. The first COVID-19 infections in Germany were detected at the end of January 2020, but could be fully contained. The number of infections began to increase again at the end of February, at about the same time when infection numbers in other European countries went up as well. From then on, the remainder of 2020 can be roughly divided into three phases: (1) a first wave of the COVID-19 pandemic in March and April, (2) a relaxation phase during summer, and (3) a second wave of infections starting in October. Each phase was accompanied by a comprehensive set of political measures to either restrict public, private, and economic life to contain the spread of the pandemic or to relax the measures taken if the number of new infections permitted it (see Figure 1).

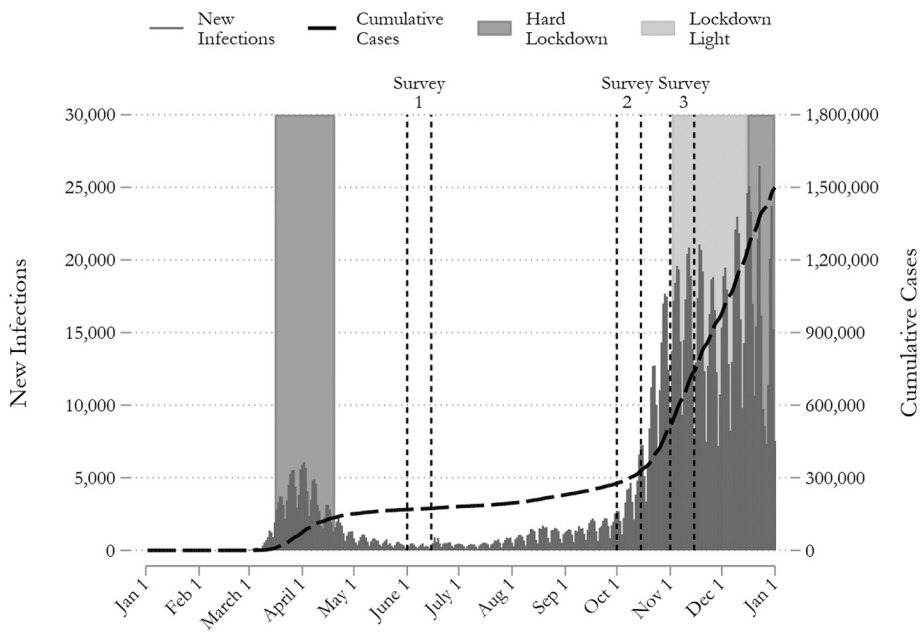

Figure 1. Number of New Corona Infections Per Day and Cumulative Number of Infections in 2020

Source: RKI (2/17/2021).*Notes:* The figure illustrates the spread of the COVID-19 pandemic from January 1, 2020, to January 1, 2021, in Germany. The gray bars represent the number of daily new infections, and the dashed black line shows the number of cumulative cases. The gray shaded areas indicate when Germany was in "lockdown." In addition, the dotted black lines indicate when our data were collected for each of the three survey waves.

At the beginning of the first wave in March, infection numbers started to follow an exponential trend, forcing policy makers to implement restrictive containment measures. On March 16, German states mandated school and kindergarten closures, postponed the academic semesters, and prohibited visits to nursing homes, thereby marking the beginning of Germany's first lockdown (see the dark gray shaded area in Figure 1). One week later, many businesses and venues where people gather were shut down as well, including restaurants, bars, hotels, most retail stores, cinemas, theaters, libraries, museums, and playgrounds. The same was true for personal service providers such as hairdressers and beauty salons, excluding those providing medically necessary services. Moreover, public events were prohibited, and it was no longer allowed to meet with more than one person living in another household. While it was not forbidden to leave home, people were asked to limit stays in public places to a minimum (Bundesregierung, 2021).

By the end of April, the infection curve had considerably flattened. Therefore, the federal and state governments decided to gradually relax the lockdown measures. Schools opened again, first only for students of graduating classes, then for other classes as well. However, regular school attendance for all students was only possible after the end of the summer holidays in August/September. In mid-May, restaurants, hotels, and retail stores were allowed to reopen, provided that employees and customers comply with strict hygiene and distancing rules. After the summer holidays, however, infection numbers increased again and by late August had returned to the levels of April. By October, experts believed a second wave of the pandemic was inevitable.

As the number of newly reported infections continued to rise, the German chancellor Angela Merkel and the 16 prime ministers of the German states announced a partial lockdown on October 28. The partial lockdown or "lockdown light" came into effect on November 2 (see the light gray shaded area in Figure 1) and was initially meant to last until the end of the month. During this lockdown period, a maximum of ten people from at most two households were allowed to meet. Coffee shops, restaurants, bars, theaters, cinemas, museums, swimming pools, gyms, beauty salons, and other similar venues had to close. In contrast to the first lockdown in March, however, retail stores, schools, and kindergartens remained open (Bundesregierung, 2021).[1]

2.2. *Data*

To assess how the COVID-19 pandemic affected different socio-demographic groups, we rely on a novel survey data set that was designed and collected as part of the so-called "Corona-BUND-Study."[2] The survey was conducted by forsa, one of the largest private survey companies in Germany. The sample comprises about

[1]While these measures stabilized daily infection numbers, they did not reduce them. For this reason, the partial lockdown was first extended and then stricter measures were imposed from December 16 onward.

[2]The Corona-BUND Study is a dynamic nationally representative survey conducted by the ifo Institute, forsa, Charité, and PI Health on behalf of the German Federal Ministry of Health with the aim of analyzing population-representative data on the spread of the COVID-19 pandemic and its socio-economic, socio-psychological, and medical consequences.

30,000 representatively selected participants from the German population aged 18 or above, who were surveyed in three waves over a period of 5 months. While survey participants of the forsa.omninet panel are recruited offline as a stratified random sample (stratification is based on census data) to resemble the German population, the survey itself was conducted online. To account for stratification and to correct for potential selected non-response, forsa provides survey weights for the final sample which we use in our analysis.

The first survey wave (Survey 1) with 30,067 respondents took place from June 8 to June 20, 2020, during a period of low infection rates and relaxing restriction. The second survey wave (Survey 2) with 30,499 respondents was carried out from October 20 to October 31, 2020, at a time when infection rates rose sharply. Finally, 27,883 respondents participated in the third survey wave (Survey 3) rolled out between November 12 and November 19, 2020. During the last survey wave, new restrictions on public and private life ("lockdown light") had been in place for about 2 weeks (see also Figure 1 in Section 2).

Inter alia, each survey wave contained a series of questions eliciting whether, in which regard, and to what extent the survey participants were affected by the COVID-19 pandemic. For instance, the participants were asked whether they or their family members were tested positive for the coronavirus, whether they were released from their job temporarily or permanently as a consequence of the COVID-19 crisis, whether the pandemic affected their household income, how stressful they perceived the restrictions of public life to be, and how their social contacts have changed.

Table 1 provides an overview of the ten variables available in all three survey waves that we use in our analysis to elicit the different dimensions in which people are affected by the COVID-19 pandemic. Table B1 in the appendix provides an overview of the original questions asked in German for each survey wave. Note that—depending on the question—the precise wording may vary over the three survey waves. This is especially true for the question on "Burden Due to Public Restrictions" (see also Table 1). This must be kept in mind when interpreting our empirical results. Therefore, in our baseline analysis, we always analyze all three waves separately.

Besides questions on whether and how respondents were affected by COVID-19, the data set also contains a series of socio-demographic and household characteristics. For our analysis, we use information on gender, age, employment and occupational status (as of February 2020), education, marital status, number of children, income class (as of February 2020), type of house (detached house, semi-detached house, apartment building etc.; with or without garden), and region (East or West Germany). As only the information on gender, age, education, and region is available in all three waves, whereas questions on the number of children, income and employment status as of February 2020, house type, and garden was only asked in Survey 1, we restrict our sample to the 22,351 respondents who participated in all three survey waves and merge the data. Table B2 in the appendix contains information about the exact definition and coding of each variable, while Table B3 shows the distribution of gender, age, education, and region in all three waves as well as in the combined data set.

TABLE 1
VARIABLES ELICITING TO WHAT EXTENT RESPONDENTS ARE AFFECTED BY THE COVID-19 PANDEMIC

Variable	Survey Question
Positive Test	"Have you already been tested positive for the coronavirus, i.e., could an infection with the coronavirus be detected?"
Infections in the Family	"Has someone in your family ever been diagnosed with coronavirus/Covid-19 in the past two weeks?"
	"Has someone in your family ever been diagnosed with coronavirus/Covid-19 before?"
Concern about Own Infection	"During the last two weeks, how concerned were you about contracting the coronavirus?"
Concern about Family/ Friends Getting Infected	"During the past two weeks, how concerned were you about friends or family members getting infected with coronavirus?"
Difficulty following contact restrictions	"In the last two weeks, how burdensome did you perceive the restrictions on public life when leaving your home to be?" (Survey 1)
	"How burdensome do you find the restrictions on public life adopted because of the Corona pandemic to be?" (Surveys 2 and 3)
Social Contacts	"How have your personal contacts with people outside of your household changed—compared to the situation before the Corona crisis?"
Burden Due to Contact Restrictions	"How difficult was it for you to follow the recommendations to avoid close contact with other people?"
Financial Concern	"How concerned were you over the last two weeks that the Corona crisis would get you into financial troubles?"
Changes in Income	"Has your household's net monthly income changed since February 2020?" (Survey 1)
	'Has your household's net monthly income changed since June 2020?' (Survey 2)
	'Is this a result of the Corona crisis or has your household's net income changed for other reasons?'
Discontinuation of Employment	'Have you been dismissed from a job (temporarily or permanently) since February 2020?' (Employees)
	'Have you terminated or limited your professional activities since February 2020?' (Self-employed)
	'Was this due to the Corona crisis or a Corona infection?'

Notes: Survey 2 did not specifically ask about infections in the family. The variable *Infections in the Family* was therefore determined using the information on whether one knows a person who was infected with coronavirus from Survey 2 and information on infections in the family from Survey 3. Survey 3 does not contain information on income and occupation. The variables *Changes in Income* and *Discontinuation of Employment* were thus imputed using the respective information from Survey 2.

3. Descriptive Statistics

Before explaining our estimation strategy and presenting the main results, we start with a descriptive analysis of the answers given to the survey questions on how the COVID-19 pandemic impacts people's lives. Figure 2 illustrates the distribution of answers given to each of the ten questions used in our main analysis.

Only 0.3 percent of respondents state that they were tested positive for the coronavirus in Survey 1. This number increased only slightly to 0.5 percent in Survey 2 and to 0.8 percent in Survey 3 (Figure 2a). Although this number seems very small, it roughly corresponds to the total share of positive test results in the German population at the time the surveys were conducted. A notable larger fraction, i.e., 3.5 percent in Survey 1, 7.7 percent in Survey 2, and 10.9 percent in Survey 3 report to have at least one family member who was tested positive for the coronavirus (Figure 2b).

Figure 2c and d show that people grew more concerned about the virus over time. In Survey 1, i.e., in June 2020, 31.4 percent of respondents answered that they were not concerned about contracting COVID-19. This share more than halves to 14.0 percent in Survey 2 (October 2020) and further decreases to 13.8 percent in Survey 3 (November 2020). Inversely, the share of respondents who

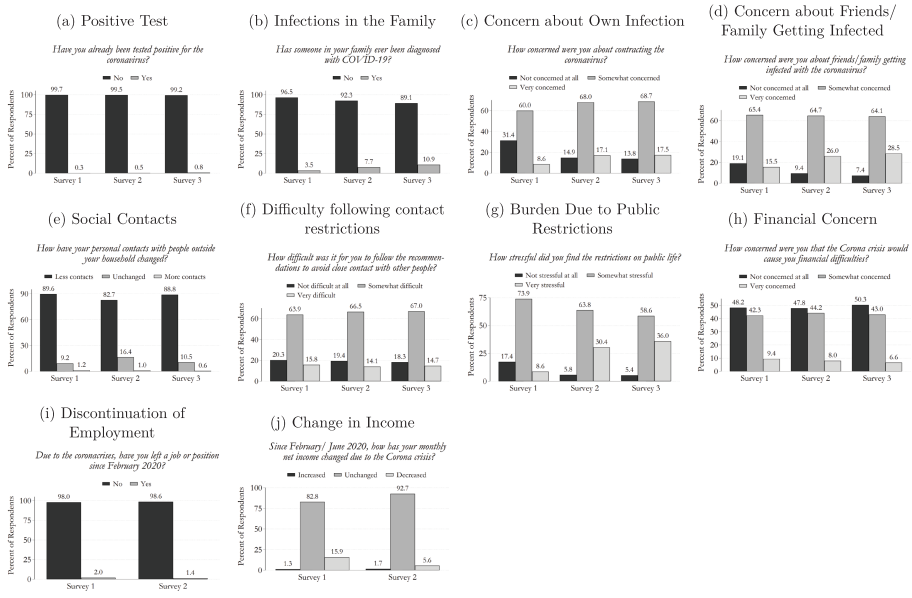

Figure 2. Consequences of the COVID-19 Pandemic

Notes: The figure illustrates the frequency distribution of answers given to each of the ten questions/ variables used in our analysis by survey wave. In the surveys, answers to *Concern about Own Infection*, *Concern about Friends/ Family Getting Infected*, *Burden Due to Contact Restrictions*, *Burden Due to Public Restrictions*, and *Financial Concern* were given on a Likert-scale ranging from 1 (not concerned/ difficult/stressful) to 5 (extremely concerned/difficult/stressful). For illustrative purposes, we group answers 2 and 3 together to indicate somewhat concerned/difficult/stressful and group answers 4 and 5 together to indicate very concerned/difficult/stressful. Similarly, for Figure 2e we combine answers "Much less/more contacts" and "Somewhat less/more contacts." Note that the precise wording of some questions varies over the three survey waves (see Tables 1 and B1). This is especially true for the question on "Burden Due to Public Restrictions."

were somewhat or very concerned increases from 60.0/8.6 percent in Survey 1 to 68.0/17.1 (68.7/17.5) percent in Survey 2 (Survey 3). Similarly, the share of respondents answering that they are not concerned about their friends and family members contracting the virus decreases over the different survey waves while the share of respondents answering to be either somewhat or very concerned increases.

Interestingly, Figure 2c and d also reveal that people seem to be more concerned about their friends and family members contracting the virus than contracting it themselves. In all three survey waves, the share of respondents stating not to be concerned (to be very concerned) about their friends and family becoming infected with the coronavirus is smaller (larger) than the share of respondents stating not to be concerned (to be very concerned) about becoming infected themselves.

How do people comply and deal with the social distancing recommendations? Over 80 percent of respondents in each survey report that they have had fewer social contacts than before the onset of the pandemic. Only 9.2 (10.5) percent in Survey 1 (Survey 3) report that their personal contacts with people outside their household remained unchanged. In Survey 2, which was conducted in October, when infection rates started to increase again after several weeks of low infection numbers and relaxed containment measures, the respective share was 16.4 percent. In addition, following the recommendations to avoid close contact with other people is very difficult for 14–16 percent of respondents, depending on the survey wave; 18–20 percent did not find it difficult at all (Figure 2e and f).

As mentioned above, the wording of the question on "Burden Due to Public Restrictions" changed over the three survey waves (see also Table 1). Assuming that this does not hinder comparison over time, we find that people experience the restrictions on public life to be increasingly stressful. In June, i.e., in Survey 1, 17.4 (73.9) percent of respondents claimed that the restrictions are not stressful at all (somewhat stressful). Their share decreased to 5.8 (63.8) percent in October, i.e., in Survey 2, and to 5.4 (58.6) percent in November, i.e., in Survey 3. Mirroring this development, in June, only 8.6 percent of our respondents stated that the public restrictions are very stressful. By November, their share increased to 36.0 percent (Figure 2g). However, these results should be interpreted with caution as the wording of the corresponding question changed. Due to that, we analyze all three waves separately in our subsequent analyses.

COVID-19 did not only force people to reduce their social contacts and restricted public life, but it also dampened the economy. Consequently, about half of the respondents—48–50 percent, depending on the survey wave—reported at least some concerns that they may get into financial trouble because of the pandemic. However, only 7–10 percent stated that they are very concerned (Figure 2h). Two percent of respondents in Survey 1 have been released from their job due to the consequences of the COVID-19 pandemic. The share of respondents who, from February to June 2020, experienced a reduction in household income due to the pandemic was 15.9 percent. These figures highlight the severity of the recession the COVID-19 pandemic has caused in Germany. In Survey 2, the share of respondents who experienced a reduction in household income from June to October 2020 drops to 5.6 percent, however. The share of respondents who were released from their job is 1.4 percent (Figures 2i and j). Unfortunately, questions on employment and income were not included in Survey 3, as the third survey wave was carried

out only around 3 weeks after the second wave. We are therefore unable to provide evidence on the development of employment and income as Germany toughened containment measures in November.

4. Estimation Strategy

To examine how different socio-demographic groups are affected by the COVID-19 pandemic, we proceed in two steps. First, we perform a common factor analysis to reduce the dimension of our data. That is, we reduce our ten variables characterizing how COVID-19 impacted people's lives into a smaller number of underlying common factors. Next, we model the relationship between the identified common factors and different socio-demographic variables using linear regression.

Common factor analysis is a multivariate technique that infers the underlying or latent variables from empirical observations of many different variables. It assumes that the observed variation between variables is due to some underlying common factor. It thus partitions variation in the observed variables into common and unique variation. Observed variables exhibiting a high degree of common variation are combined into common factors.

Stated more formally, the common factor model expresses an observed variable, z_{ji}, as a linear combination of n independent common factors, F_{ki}, and a unique factor, u_{ji} for individual i:

$$z_{ji} = \sum_{k=1}^{n} w_{jk} F_{ki} + u_{ji}, \tag{1}$$

where $j = (1, 10)$. w_{jk} represents the so-called factor loading and reflects the strength of the association between variable j and factor k. After having extracted the common factors from the data and having determined the factor loadings, we compute and standardize factor scores, ZF_{ki}, for each observation in the data (see Section 5.1 for details). Common factor analysis uses correlation matrices to obtain factor solutions. As our observed variables are either ordinal or binary, we use polychoric rather than Pearson correlations. Table B4 in the appendix presents the polychoric correlation matrix.

In the second step, we regress the individual factor scores on a number of socio-demographic characteristics by ordinary least squares (OLS). Note that we pool the data of the three survey waves to perform the common factor analysis but estimate the OLS regressions separately for each survey wave.[3] That is, for each identified common factor, we estimate the following regression equation:

$$ZF_{kis} = \alpha_{ks} + \beta_{ks}{}' X_i + \epsilon_{is}, \tag{2}$$

where s denotes the survey wave, X_i is a vector of socio-demographic characteristics (gender, age, employment and occupational status, education, number of

[3]Performing a separate factor analysis for each survey wave yields very similar results. The results are available upon request.

children, income class, house type, garden, and region), and the vector β_{ks} presents the coefficients of interest. ϵ_{is} denotes the error term. Survey weights ensure that our sample is representative of the German population.

5. Main Results

In this section, we present our empirical findings. First, we present the results of the factor analysis in Section 5.1. Next, we show the findings of the regression analysis in Section 5.2.

5.1. *Results of the Common Factor Analysis*

Factor analysis extracts common variation from observable variables and combines them to factors.[4] Because, in general, as many factors can be extracted as there are variables, the first step in factor analysis is to identify the number of relevant factors in the data. A common criterion to decide how many factors should be retained is the so-called Kaiser criterion which states that only factors whose eigenvalue is greater than one should be considered as factors. The eigenvalues measure the common variance between the factors and the original variables. They thus indicate how much of the original variables' variance is explained by a particular factor. An eigenvalue greater than one implies that a factor explains a larger part of the common variance of the original variables than any single variable. Figure A2 in the appendix depicts the eigenvalue of each factor ordering the eigenvalues from largest to smallest (the so-called screeplot). Only two factors have an eigenvalue greater than one, and we thus retain those for the subsequent (baseline) analysis. Yet, as the eigenvalue of the third factor is just slightly below one, we use three factors as a robustness check in Section 6.

Table 2 presents the factor loadings, i.e., the bivariate correlation coefficients for the ten observed variables and the two extracted factors. To facilitate the interpretation of the factors, factor loadings have been rotated using the varimax rotation method.[5] The table shows that the variables *Concern about Own Infection* and *Concern about Family/ Friends Getting Infected* load strongly on the first factor. The variables *Financial Concern*, *Changes in Income*, and *Discontinuation of Employment* as well as *Burden Due to Public Restrictions* and *Burden Due to Contact Restrictions* load strongly on the second factor. We thus interpret Factor 1 as *Concern about Infection* and Factor 2 as *Socio-Economic*

[4]Note that the Kaiser–Meyer–Olkin (KMO) test statistic for our sample is 0.5435. The KMO test indicates how suited the data are for factor analysis. A rule of thumb for interpreting the statistic is that KMO values that are lower than 0.5 indicate that the data are not well suited.

[5]When extracting factors from the observed variables, the first factor explains as much as possible of the variables' total variance, the second factor explains as much as possible of the variance not explained by the first factor, and so on. However, this solution does not necessarily provide a meaningful interpretation as the factor loadings on the second factor are always smaller, on average, than the factor loadings on the first factor. By rotating the coordinate axes at their origin, factor loadings divide more sensibly among the factors which simplify factor interpretation. The varimax rotation method rotates the factor loading to maximize the sum of the variances of the squared loadings. It is an orthogonal rotation method, meaning that after rotation the factors are uncorrelated. Note that unrotated factor loadings are presented in Table B5 of the appendix.

TABLE 2
Rotated Factor Loadings

	Factor1	Factor2	Uniqueness
Positive Test	0.125	0.036	0.983
Infection in the Family	0.199	0.057	0.957
Concern about Own Infection	**0.844**	0.021	0.287
Concern about Family/ Friends Getting Infected	**0.859**	0.015	0.262
Burden Due to Public Restrictions	0.188	**0.352**	0.841
Social Contacts	−0.243	−0.140	0.921
Burden Due to Contact Restrictions	0.104	**0.386**	0.840
Financial Concern	0.100	**0.606**	0.623
Changes in Income	−0.101	**0.534**	0.704
Discontinuation of Employment	−0.009	**0.538**	0.711
N	67053		

Notes: The table presents the factor loadings for the ten observed variables when two factors are retracted. To facilitate the interpretation of the factors, factor loadings have been rotated using the varimax-rotation method. Factor loading ≥ 0.3 are in bold to improve readability. The last column shows the "uniqueness" of each variable, i.e., the variance that is "unique" to the variable and not shared with other variables.

Strain. The last column of Table 2, captioned "uniqueness," shows the variance that is unique to the original variable, i.e., not shared with the other variables. 28.7 percent of the variance in the variable *Concern about Own Infection*, for instance, is unique to this variable, whereas the remaining 71.3 percent are shared with the other variables.

In a final step, we use the factor loadings to generate factor scores for each observation in our data and standardize these factor scores so that they have a mean of zero and a standard deviation of one. The factor scores represent weighted averages of the original variables used in the factor analysis. The weights are determined by multiplying the inverse correlation matrix of the original variables with a matrix containing the correlations between the factors and original variables, i.e., the factor loadings.[6] Figure A3 in the appendix shows the distribution of factor scores for both factors, and Figure A4 plots their joint distribution. For illustrative purposes, we have divided factor scores into three groups: "hardly affected" for scores below − 1, "moderately affected" for scores between − 1 and 1 and "strongly affected" for scores above 1. As one can see, about half of the observations in the pooled data set are both moderately concerned about infections and experience a moderate socio-economic burden. About 3.2 percent of observations are strongly affected by both factors, whereas 1.2 percent are hardly affected by either factor.

In addition, Figures A5 and A6 in the appendix reveal that COVID-19 affectedness is highly persistent over time by plotting the relationship between the factor score decile in Survey 1 and the median factor score decile in Surveys 2 and 3 for

[6]In principle, there is an infinite number of factor score vectors for each common factor. The approach applied here is known as the regression method, which is the most common method used to compute factor scores. This method maximizes the correlation between factor scores and the common factors. However, it does not necessarily provide unbiased and consistent estimates of the "true" factor scores. Note, though, that using the Bartlett method, which provides consistent estimates of the true factor scores, yields very similar results.

the two factors, respectively. The figures show that respondents who were strongly (hardly) affected by COVID-19 in June tend to be also strongly (hardly) affected in October and November.

5.2. *Results of the Regression Analysis*

The factor analysis identified two dimensions in which the COVID-19 pandemic mainly affects people—*Concern about Infection* and *Socio-Economic Strain*. However, which population groups are affected the most and in what dimension? To answer this question, we regress the standardized factor scores on several socio-demographic characteristics such as gender, age group, employment, income class, and others. Figures 3 and 4 illustrate the regression results by survey wave (which are also shown in Table B6). The black circles represent regression coefficients. Larger (smaller) factor values indicate that respondents are affected by the adverse consequences of the COVID-19 pandemic to a larger (smaller) extent. Thus, if the regression coefficient is greater (smaller) than zero, the corresponding characteristic is associated with an above-average (below-average) exposure to the adverse COVID-19 effect. Confidence intervals are depicted by the gray lines. The darker (lighter) shade of gray represents 90 (95) percent confidence intervals.

5.2.1. Concern about Infection

Figure 3 shows how different socio-demographic characteristics are associated with *Concern about Infection*. In each survey wave, women are significantly more concerned about corona infections then men. They also grow more concerned over time. The point estimates indicate an increase in the corresponding factor by 0.05, 0.11, and 0.16 standard deviations in Surveys 1, 2, and 3, respectively. That is from Survey 1 to Survey 3, the point estimate has more than tripled. In Survey 1, concerns about infections increase with age. Interestingly, the sign of the relationship changes in Surveys 2 and 3. One interpretation of this finding is that people's concerns are related to their relative infection risk which shifted from older to younger groups over time (see Figure A1 in the appendix).

There are no statistically significant differences in *Concern about Infection* between employment groups. However, *Concern about Infection* varies somewhat by occupation. In June (Survey 1), the self-employed as well as manual workers were significantly less concerned about infections. That is, compared to non-employed respondents, the level of concern is 0.27 and 0.14 standard deviations lower for self-employed and manual workers, respectively. By October (Survey 2), the point estimate decreased (in absolute terms) to – 0.19 for the self-employed and – 0.13 for manual workers. Point estimates are close to zero (– 0.07 and – 0.005) and no longer statistically significant in November (Survey 3). In turn, civil servants are now more concerned about infections with an estimate of 0.18, which is statistically significant at the 1 percent level.

Concern about Infection is higher for respondents with an educational degree compared to respondents without a degree, but coefficients are only statistically different from zero for respondents with the highest educational degree (i.e., a university or college degree) in Survey 3. Similarly, there are no large differences in

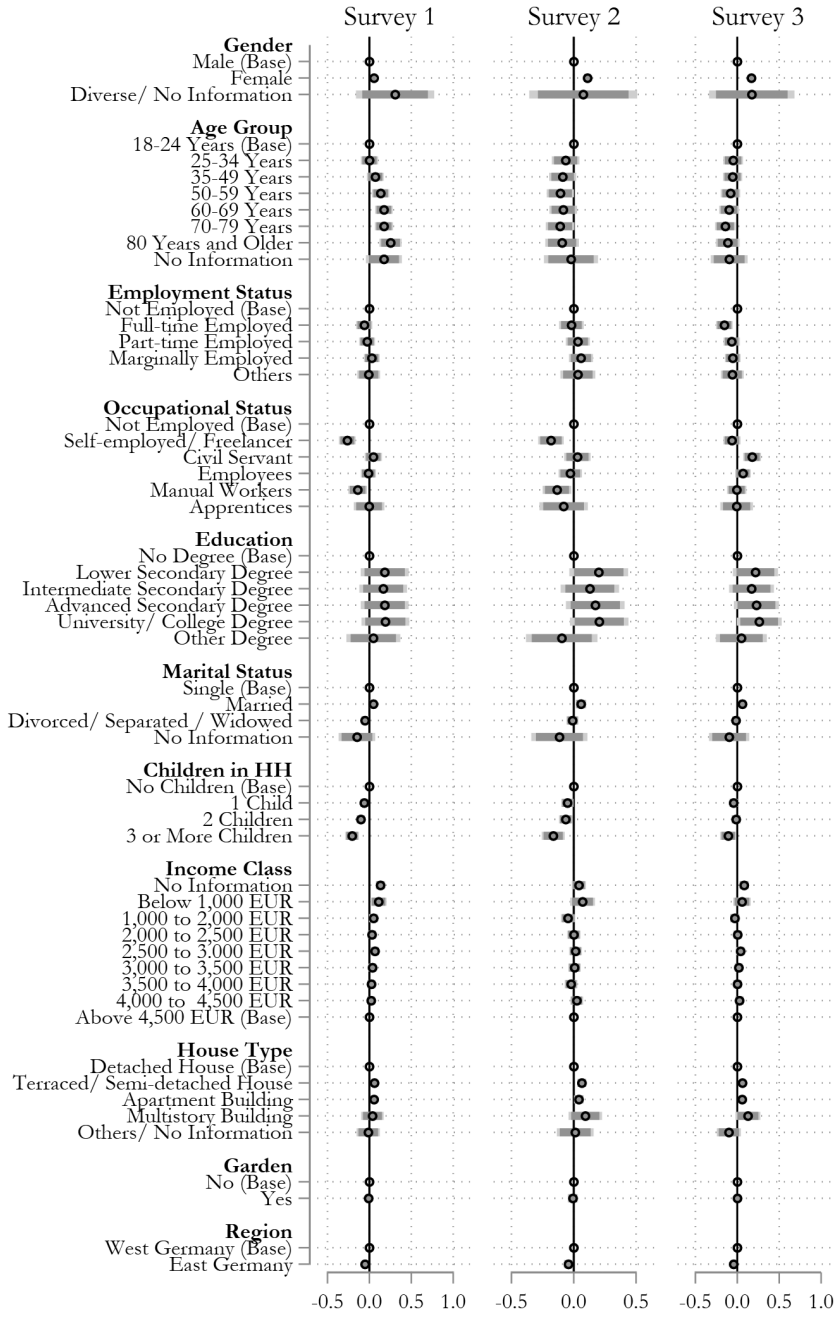

Figure 3. Regression Results: Concern about Infection (Factor 1)

Notes: The figure presents the estimated relationship between Factor 1 and a large number of socio-demographic characteristics by survey wave. The black circles represent OLS regression coefficients. Confidence intervals are depicted by the gray lines. The darker shade of gray represents 90 percent confidence intervals, and the lighter shade represents 95 percent confidence intervals.

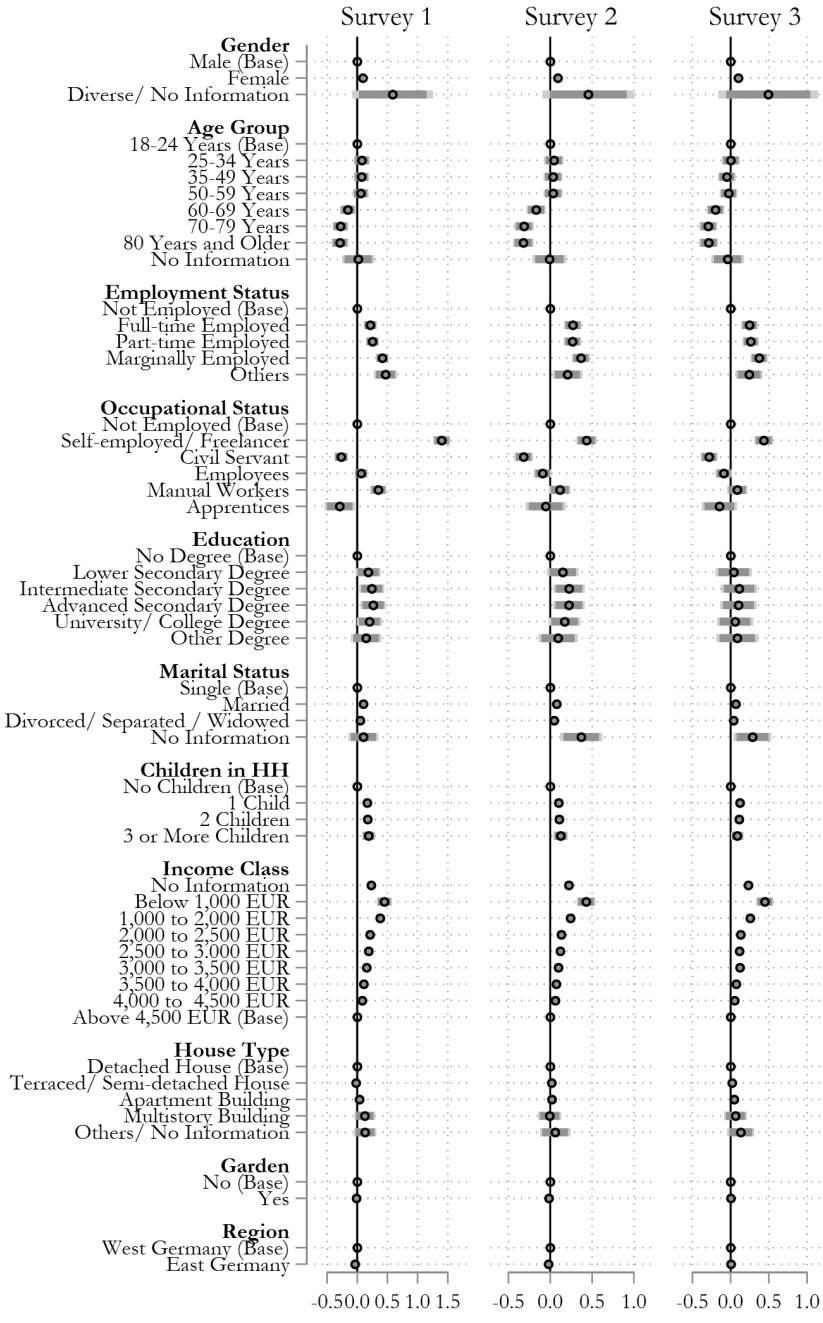

Figure 4. Regression Results: Socio-Economic Strain (Factor 2)

Notes: The figure presents the estimated relationship between Factor 2 and a large number of socio-demographic characteristics by survey wave. The black circles represent OLS regression coefficients. Confidence intervals are depicted by the gray lines. The darker shade of gray represents 90 percent confidence intervals, and the lighter shade represents 95 percent confidence intervals.

Concern about Infection by income class. Whether or not respondents have a garden does not play a role for *Concern over Infection* either. However, in all three survey waves, respondents living in terraced/ semi-detached houses or in apartment buildings are more concerned about COVID-19 infections than respondents living in detached houses. Moreover, East Germans are, on average, less concerned about infections than West Germans. Coefficients are rather small though—between – 0.04 and – 0.05, depending on the survey wave.

5.2.2. Socio-Economic Strain

The results in Figure 4—showing the association between different socio-demographic characteristics and the common factor for *Socio-Economic Strain*—indicate which groups of society are particularly affected by the economic consequences of the COVID-19 crisis. Importantly, women suffer from the pandemic's adverse economic effects to a greater extent than men, although the differences are of modest size with about 0.10 standard deviations larger effects for women than for men. In addition, the economic strain caused by the pandemic varies across age groups, although most effects are not statistically significant. Only respondents above 70 experience a statistically significantly lower economic strain (than the youngest baseline group) in all three survey waves. This result can most likely be explained by the fact that pension income is unaffected by current economic conditions.

Compared to non-employed respondents, employed respondents bear a larger socio-economic burden, with estimates being the largest for marginally employed individuals. In fact, coefficients for marginally employed are quite sizable: On average, the indicator of *Socio-Economic Strain* is 0.42 standard deviations larger in Survey 1 and 0.37/0.38 standard deviations larger in Survey 2/3 than it is for non-employed respondents. These effects are significant at the 1 percent level. Arguably, this finding reflects that marginally employed workers are not entitled to short-time work benefits (*Kurzarbeitergeld*)[7] and are hence not compensated for their wage loss in case their working hours are reduced.

In terms of occupational status, we find that in June (i.e., Survey 1) by far the largest economic burden was born by the self-employed, whose level of economic strain is 1.40 standard deviations larger than that of non-employed respondents, followed by manual workers with an estimate of 0.35. Estimates for civil servants and apprentices are – 0.27 and – 0.25, respectively. Interestingly, the picture changes somewhat when looking at the results for Surveys 2 and 3. For one, the point estimates for both self-employed respondents and manual workers decrease quite substantially to 0.43 for the self-employed and to 0.12/0.09 for manual workers, respectively. Unsurprisingly, as in Survey 1, civil servants suffer from economic strain to a much lesser extent also in the later survey waves, with estimates of – 0.32 and – 0.28, respectively.

[7]The German short-time work program allows employers who are affected by the COVID-19 crisis to reduce the working hours of their employees (by up to 100 percent) without laying them off. In case of a reduction in working hours, employees are compensated by the government for 60 percent of their wage loss (67 percent for employees with children). However, only regularly employed workers are entitled to short-time work benefits.

Our findings also indicate that the level of economic strain caused by the pandemic is inversely related to household income. Compared to respondents with a monthly net household income above 4,500 euros, respondents with lower income levels bear a significantly larger economic burden in all three survey waves with the estimates monotonically decreasing with income class. The largest effect is found for respondents disposing of a monthly net household income below 1,000 euros, who experience a level of economic strain that is 0.40–0.42 standard deviations larger than for high-income households in all three waves. This result suggests that the economically weakest members of society suffer from the economic consequences of the crisis to a larger extent. Another disturbing result is that respondents with children are more affected by the pandemic's economic consequences. The corresponding point estimates are 0.20, 0.13, and 0.14 in Surveys 1, 2, and 3, respectively. In fall 2020, shortly before the second and third waves of our survey were fielded, the German government made a one-time payment to families with children of 300 euros per child (*Corona Kinderbonus*). Arguably, our findings suggest that the payment was not sufficient to alleviate the situation of families with children. Finally, East Germans appear to be less severely affected by the economic consequences of the COVID-19 crisis.

Note the explanatory power of the regression model explaining *Socio-Economic Strain* (measured by the R^2 is seven to eight times larger than the explanatory power of the model explaining *Concern about Infection*). One possible explanation is that sentiments and perceptions are less strongly related to socio-demographic characteristics than economic outcomes.

6. Robustness Tests

To test the robustness of our results, we modify our empirical specification in several ways. In a first robustness test, we retain three instead of two factors from our factor analysis. Next, we re-estimate our regression model using the ten observed individual variables as our outcome variables instead of the standardized factor scores. Moreover, to account for the fact that the error terms may be correlated across the regression equations, we estimate seemingly unrelated regressions (SUR) as a generalization of our linear regression model. Finally, we pool all three waves and estimate panel regression models.

6.1. *Retaining Three Common Factors*

Figure A2 in Section 5.1 shows that two factors in the factor analysis have an eigenvalue greater than one which we retained for the baseline analysis. As the eigenvalue of the third factor is just below one, we test whether our results hold when retaining three factors in this section. Table B8 in the appendix presents both unrotated and varimax-rotated factor loadings. As one can see, the third factor loads most strongly on the variables *Positive Test* and *Infection in the Family*. We thus interpret Factor 3 as *Exposition to the Virus*.

Again, we predict and standardize factor scores for each of the three retained factors. Regressing the factor scores on socio-demographic variables shows that retaining three rather than two factors just slightly changes the

coefficient estimates for Factors 1 and 2, but does not affect their sign nor their statistical significance. Therefore, the conclusions that we draw in Section 5.2 remain unchanged. Looking at the regression results for Factor 3, we find that female respondents are more likely to have contracted the virus or to have a family member who was infected. Furthermore, *Exposition to the Virus* is negatively associated with age and positively associated with income (see Table B9 in the appendix).

6.2. *Individual Regressions*

As a second robustness test, we re-estimate Equation 2, but use the ten observed variables eliciting whether and to what extent respondents are affected by COVID-19 as outcome variables instead of factor scores. Tables B10–B19 of the appendix show the results. All in all, we find that regressing the single variables individually on socio-demographic characteristics produces results that are qualitatively very similar to those for the factor scores, thus leaving our conclusions unchanged.

For instance, both the concern about getting infected and the concern that friends or family members get infected are significantly higher for women and for respondents living in terraced/ semi-detached houses, whereas respondents with children are less concerned. Moreover, *Concern about Own Infection* increases with age in Survey 1 but coefficients turn statistically insignificant in Surveys 2 and 3. Our results further indicate that women are more likely to lose their jobs (temporarily or permanently) during the pandemic and are more worried that the pandemic will cause them financial difficulties. The same is true for respondents with lower household income. Civil servants and employees, on the contrary, are less likely to lose their jobs and are less financially concerned, whereas self-employed respondents and manual workers face a higher job-loss risk and are more concerned.

6.3. *Seemingly Unrelated Regressions*

So far, we have estimated Equation 2 separately for Factors 1 and 2. To account for the fact that the error terms may be correlated across equations, we re-estimate all specifications using SUR and, thus, allow the error term to be correlated across the specifications of our empirical model. The results are presented in Table B20 of the appendix. While SUR estimation leaves the coefficient estimates unaffected, the estimated standard errors may change. In our case, they actually become smaller, meaning that our estimation becomes more efficient. Consequently, the conclusions drawn in Section 5.2 are unaffected by this robustness test.

6.4. *Panel Regression*

To exploit the panel dimension of the data explicitly, we estimate panel regression models on the pooled sample instead of estimating a separate model for each wave. As many factors are time constant, we estimate a pooled OLS model with

dummy variables for the different waves as well as a random effects (RE) model. Table B7 in the appendix reports the results.

Both the OLS and RE models yield similar results (both in terms of point estimates and significance). Comparing the panel estimates to those of our baseline specification suggests that the estimates from the pooled specification can be interpreted as average effects across the three survey waves. Thus, our conclusions remain unchanged.

7. Extensions

The factor analysis in Section 5.1 was based on ten variables that were included in all three survey waves. However, there are also a number of variables describing how respondents were affected by the corona crisis that were only included in single waves. In this section, we extend our analysis and examine the correlation between those variables and our two common factors *Concern about Infection* and *Socio-Economic Strain*. In particular, we look at how the COVID-19 pandemic has affected the relationship with family members and friends (Section 7.1), household finances (Section 7.2), as well as consumption behavior (Section 7.3).

7.1. *Relationship with Family Members and Friends*

The COVID-19 pandemic as well as the political measures taken to contain it forced people to reduce social contacts and spend more time at home. These changes are likely to have affected the quality of the relationship with family members and friends. In Survey waves 1 and 3, respondents were asked how these relationships have changed since the beginning of the pandemic. Figures A7a and A7b in the appendix show the distribution of answers. In both survey waves, 70.7 percent of respondents answered that the quality of the relationship with family members has remained unchanged. However, whereas in June (Survey 1) 15.2 percent answered that the quality has become somewhat or much better, this share almost halved to 8.4 percent in November (Survey 3). Inversely, in June 14.1 percent of respondents stated that the quality of their relationship with family members has become somewhat or much worse since the beginning of the pandemic. By November this share increased to 20.9 percent (Figure A7a). The picture looks somewhat different for the quality of the relationship with friends. While the majority of respondents also stated that their relationship with friends remained unchanged, i.e., 62.7 percent in Survey 1 and 53.2 percent in Survey 3, the share of respondents feeling that their relationship with friends has become somewhat or much worse (better) is considerably higher (lower) than the respective share for relationship with family members: 32.2 (5.0) percent of respondents in Survey 1 and 43.7 (3.1) percent in Survey 3 indicated that their relationship with friends has worsened (improved) (Figure A7b).

Panels A and B in Figure 5 show how the changes in the quality of the relationship are associated with the two common factors *Concern about Infection* and *Socio-Economic Strain*. To illustrate these associations, we divide the standardized factor scores into 100 equally sized bins and plot the mean answers for *Relationship with Family Members* and *Relationship with Friends* for each bin as well as a linear

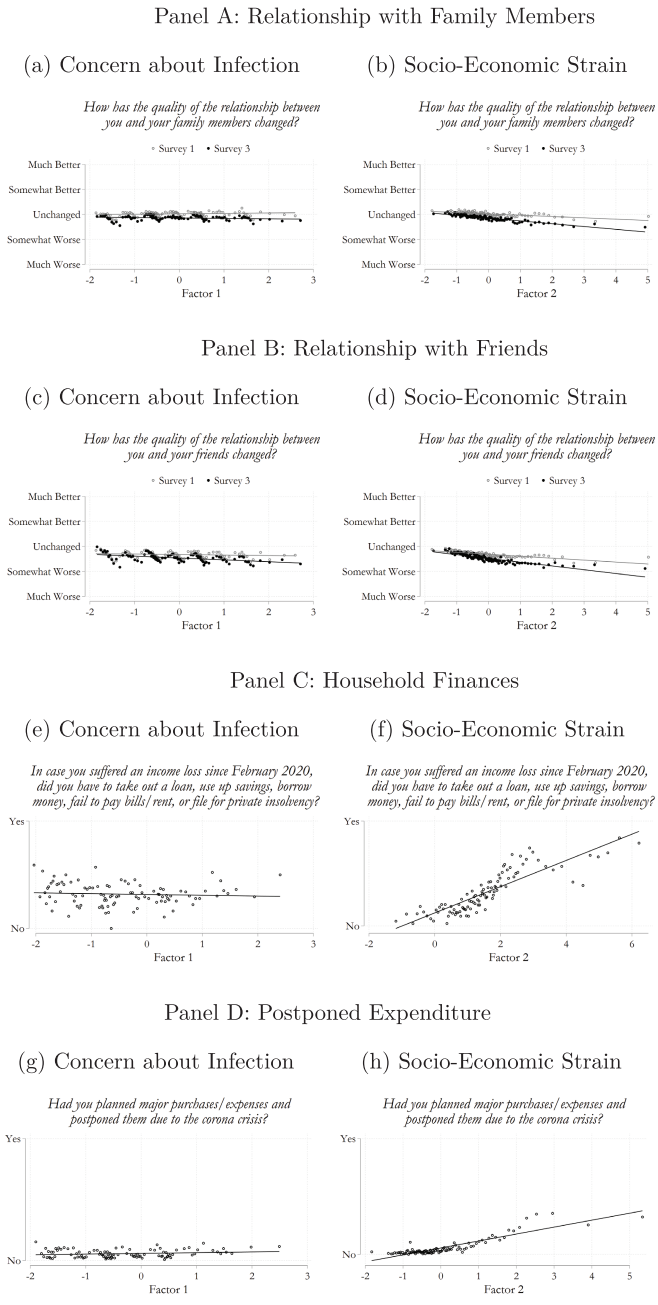

Figure 5. Extended Corona Affectedness—Correlation with Factors

Notes: The figure illustrates the relationship between *Relationship with Family*, *Relationship with Friends*, *Household Finances*, and *Postponed Expenditure* with *Concern about Infection*/*Socio-Economic Strain* using binned scatter plots. The dots/circles indicate the mean answer by bin, and the lines linear fits.

regression line for Survey 1 (in gray) and Survey 3 (in black). Both *Relationship with Family Members* and *Relationship with Friends* are inversely related to *Socio-Economic Strain*—especially in Survey 3. That is, respondents who experience a higher socio-economic strain also tend to feel that the quality of their relationship with family members and friends, respectively, has worsened since the beginning of the pandemic. Moreover, the regression line becomes steeper from Survey 1 to Survey 3, indicating that the association has become more pronounced over time. In contrast, neither *Relationship with Family Members* nor *Relationship with Friends* is correlated with *Concern about Infection*.

7.2. *Household Finances*

Figures 2h and j in Section 3 showed that about half of the survey respondents were at least somewhat concerned that the COVID-19 crisis would cause them financial difficulties and that about 16 (6) percent of respondents in Survey 1 (Survey 2) claim to have had income losses due to the crisis. In Survey 1, we also asked whether, as a result of this income loss, survey participants had to take out a loan, use up savings, borrow money, failed to pay bills or their rent, or filed for private insolvency (*Household Finances*). 68.2 percent of respondents answered "No" to this question, whereas 31.8 percent answered "Yes" (see Figure A8a in the appendix). As expected, these shares vary by income class. Whereas roughly half of the respondents with a monthly net household income below 2,000 euros were forced to take such measures, the respective shares are 33.6 percent for respondents with household income between 2,000 euros and 4,000 euros and 20.5 percent for respondents with a household income above 4,000 euros (see Figure A8b).

Figures 5e and f present the binned scatter plots for the relationship between *Household Finances* and *Concern about Infection* and *Socio-Economic Strain*, respectively. In both plots, the black circles indicate the mean answer by bin. The black lines indicate linear regression lines. As one can see, the regression line for *Concern about Infection* is nearly horizontal, while the regression line for *Socio-Economic Strain* is steeply upward sloping. Not surprisingly, the *Household Finances* question is uncorrelated with *Concern about Infection*, but highly positively correlated with *Socio-Economic Strain*. That is, the more affected respondents are economically by the COVID-19 crisis, the more likely they are to have taken out a loan, used up their savings, borrowed money, failed to pay bills/rent, or filed for private insolvency, and vice versa.

7.3. *Household Expenditures*

Finally, we asked whether the survey participants had planned major purchases or expenses but postponed them due to the COVID-19 crisis (*Postponed Expenditure*) in Survey 1. 5.7 percent of respondents answered that they postponed such an expenditure (see Figure A9 in the appendix). Several explanations come to mind to explain why people postponed large purchases during the pandemic: most retail stores were closed during the lockdown, people may have not wanted to go out in fear of risking an infection, people are more financially constrained or worried about economic insecurity, etc.

Panel D in Figure 5 suggests that postponing larger purchases or expenses during the crisis is correlated with the socio-economic strain people have experienced in the form of financial concerns and the experience of an income or job loss, but not to fear or concerns about infections. The figure shows the binned scatter plots for the relationship between *Postponed Expenditures* and *Concern about Infection* (Figure 5g) as well as *Socio-Economic Strain* (Figure 5h). As one can see, the regression line in Figure 5g is horizontal, suggesting that postponing larger purchases or expenses is unrelated to concerns about infection. On the contrary, the regression line in Figure 5h is upward sloping, implying a positive association between postponing expenditures and socio-economic strain during the pandemic.

8. Discussion and Conclusion

The global impact of the COVID-19 crisis and the measures taken by governments to contain the spread of the coronavirus impose a huge burden on societies. In this paper, we are particularly interested in the question how this burden is distributed across different population subgroups. More precisely, we analyze which groups of society suffer in what regard and to which extent from the adverse consequences of the COVID-19 pandemic. To this end, we use three waves of a self-designed representative population survey carried out in Germany during different phases of the pandemic. The first survey wave took place in June 2020 at a time of decreasing infection numbers and gradual relaxation of containment measures; the second wave was carried out in October when infection numbers started to rise again; and the third wave took place in November when infection numbers grew exponentially and containment measures were toughened.

To elicit whether, in what regards, and to what extent the German population as well as different population groups were affected by the first part of the COVID-19 pandemic in 2020, we included ten questions to our survey shedding light on its economic, social, and health consequences. Using common factor analysis, we find that the impact the pandemic has on people's lives can be summarized by two factors: the first factor reflects people's concerns that they or their family members and friends get infected with the coronavirus; the second factor captures financial concerns, the experience of job-loss, and decreasing household income due to the COVID-19 crisis as well as burdens experienced due to public and contact restrictions.

Regressing those factors on various socio-demographic characteristics reveals that different population groups are indeed affected by the pandemic to different extents. Through all three survey waves, female respondents are more concerned that they or their family members and friends get infected, while East Germans show less concern. The association between age and concern about infection varies across survey waves. Even more pronounced are the differences regarding the severity of the crisis's socio-economic consequences for different population groups. Our results suggest that self-employed respondents as well as marginally employed workers were hit particularly hard. Two alarming findings are that the socio-economic strain the

COVID-19 pandemic causes are notably higher for low-income households as well as for families with children. Thus, a policy recommendation that can be derived from our analysis is that policy measures aiming to alleviate the economic consequences of the COVID-19 crisis should include instruments targeting these two groups.

While the economic consequences of the pandemic for different population subgroups have been already studied in different contexts, the insights we provide regarding the social and emotional effects are novel. Our results concerning the pandemic's labor market consequences are generally in line with those reported by Adams-Prassl *et al*. (2020), Cortes (2020), and Montenovo *et al*. (2020), who also document that women, marginally employed, and poorly educated employees were more severely affected by the economic crisis associated with the pandemic. However, compared to the results documented by Cortes (2020) and Montenovo *et al*. (2020) for the US or Alstadsæter *et al*. (2020) for Norway, our results suggest that the labor market consequences in Germany are less severe than in other countries, supporting the findings by Adams-Prassl *et al*. (2020). One potential reason is the German short-time furlough scheme, which allows firms to reduce the working hours of their employees temporarily (down to 0 percent) to avoid lay-offs. Employees subject to this scheme receive a share of the net loss in income incurred of at least 60 percent in case the employee has no children and 67 percent in case the employee has at least one child. Unlike Adams-Prassl *et al*. (2020), though, we find that in Germany, self-employed respondents suffered the most from the economic turmoil caused by the pandemic. Arguably, this finding is not surprising, as many self-employed persons were forced to cease their work due to the extensive contact restrictions. That is, the only businesses that were allowed to remain open during the lockdown in March/April were those providing essential goods and services (e.g., supermarkets, drug stores, and health-care providers). Moreover, self-employed persons are not granted access to Germany's short-time furlough scheme.

Note that all waves of our survey were collected more or less before the German "winter lock-down" (starting in November 2020 with the so-called "lockdown light" which was tightened in December and lasted until spring 2021). Due to its sheer length, this latter lockdown could have fundamentally changed people's perception of the crisis, e.g., regarding the experience of restrictions on public life. While it would have been interesting to extend the survey to the year 2021, unfortunately, the survey was stopped after the third wave. Looking at results from the COSMO study (Betsch *et al*., 2020) shows that both worries and being burdened by the current situation increased from September until December 2020, peaking in January and then staying at a relatively high level until April 2021 before declining again to similar levels as in September 2020. Therefore, the results from our three waves in 2020 should still be informative also for the situation in 2021 and beyond.

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web site:

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