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Robinson Crusoe: less or more depressed? With whom and where to live in a pandemic if you are above 50

Inés Berniell, Anne Laferrère, Pedro Mira, Elizaveta Pronkina

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Robinson Crusoe: less or more depressed? With whom and where to live in a pandemic if you are above 50[*]

Inés Berniell[†]   Anne Laferrère[‡]   Pedro Mira[§]   Elizaveta Pronkina[¶]

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Abstract

This paper studies the differential impact of the first wave of the COVID pandemic on mental well-being across individuals with different living arrangements and housing conditions. We use data on Europeans aged 50+ interviewed in the SHARE Corona Survey, right after the first wave of the pandemic in June-July 2020, which we link longitudinally with two previous waves of SHARE (2013 and 2015). New to the pandemic period was the relatively lower mental well-being among those who lived only with a spouse and the protective impact for mental well-being of parents of having (adult) children in the same building as opposed to children, however close, who were not co-residing. Finally, living in cities and in multi-unit housing also led to a decrease in mental well-being relative to the general population aged 50+.

JEL Classification: I1, J12, J14, R19

Keywords: COVID-19, lockdown, mental well-being, living arrangement, housing, SHARE

[†]CEDLAS - IIE - Universidad Nacional de La Plata; E-mail: ines.berniell@econo.unlp.edu.ar
[‡]Université Paris-Dauphine - PSL and CREST; E-mail: anne.laferrere@dauphine.psl.eu
[§]CEMFI; E-mail: mira@cemfi.es
[¶]Université Paris-Dauphine - PSL; E-mail: elizaveta.pronkina@dauphine.psl.eu

1 Introduction

In the fight for lives during the first spike of the pandemic, governments worldwide implemented strict stay-at-home policies, lockdown, and the closure of public places. As the virus was assumed to be especially dangerous for older people,[1] their confinement was particularly strict. Confinement measures reduce the spread of the virus, but they also result in social isolation that can have adverse effects on mental well-being. The intensity of the social isolation resulting from confinement, the fear of contagion and uncertainty about the future and other effects of the pandemic and lockdown measures may depend on with whom and where people lived. As a consequence, housing and living arrangements could become key determinants of well-being during the pandemic.

Leaving aside the effect of living arrangement and housing conditions on the direct spread of the virus, we concentrate on their effect on three mental well-being indicators: depression, loneliness and having trouble sleeping of those aged 50 or more during the first wave of the COVID-19 pandemic in 2020. We use a special telephone wave of SHARE (Survey of Health, Ageing and Retirement in Europe) run in June and July 2020. Along with other questions on many aspects of their life, respondents were asked to report their mental well-being during the month preceding the interview.[2] We analyze the role of two aspects of living arrangements, household composition and distance to the nearest child; and the role of three housing characteristics, the location (rural versus urban), the type of building (single house versus multiple-unit buildings), and the number of rooms. We ask if depression, loneliness, and trouble sleeping at the end of the first wave of the COVID-19 pandemic varied with living arrangements and housing characteristics. Moreover we ask if such associations were different from those observed before the pandemic.

This paper contributes to a rapidly growing literature about the impact of the COVID-19 pandemic on mental health or well-being. Hamermesh (2020) using pre-pandemic time use surveys examines how life satisfaction is related to with whom and how long we relate. Keeping people with no children under 18, he finds that life satisfaction among married couples increases with additional time spent with each other. Among singles (above age 30), satisfaction decreases most as more time is spent alone. This leads him to predict that the most likely impacts of a lockdown will be an increase in satisfaction among couples, a decrease in satisfaction among singles. However, some have underlined the strong pressure lockdowns put on couples. Béland, Brodeur, Mikola, and Wright (2020) report an increase in financial instability and a risk of domestic violence.

While a lot is being documented on the impact for young people or working-age individuals,

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[1]This remains to be further explored. For instance in France over the period 2016-2018, 78% of deaths happened after age 75, the rate is the same for COVID deaths (our computation from INSEE data). The situation is similar in Italy and Spain. It differed in Germany, Sweden, Switzerland or Denmark, where the rate was higher for older persons (cf. Le Bras, Le Monde, 09/02/2021). In Sweden, the relative effect of age on mortality was no different during the first wave of the pandemic than before (Modig, Lambe, Ahlbom, & Ebeling, 2021).

[2]European countries started to lift stay-at-home requirements gradually in May 2020. As of June 1, 2020 only Belgium had a strict stay-at-home order that was replaced by a recommendation on June 8, 2020 (see Oxford COVID-19 Government Response Tracker). Online Appendix A, Fig. A.1 and A.2, show the evolution of stay-at-home recommendations in the 11 countries we study.

we know less about the older population. Using also SHARE data, Bertoni, Celidoni, Bianco, and Weber (2021) look at the impacts of retirement on preventive behaviour and mental health during the COVID-19 pandemic and find no effect on mental health except for singles. Several studies find an increase in mental health problems or a decrease in well-being based on longitudinal survey data (Banks & Xu, 2020; Pierce et al., 2020), on online surveys during the pandemic (Bu, Steptoe, Mak, & Fancourt, 2020; Huebener, Waights, Spiess, Siegel, & Wagner, 2021; Jace & Makridis, 2020), and Google trends (Tubadji, Boy, & Webber, 2020; Brodeur, Clark, Fleche, & Powdthavee, 2021). However, there is little evidence about the role of living arrangements (LA) and housing characteristics (HO) for mental well-being during the COVID-19. Atzendorf and Gruber (2021), using the SHARE Corona telephone survey concentrate on retired individuals aged 60 or more, and rely on answers on increases in loneliness or depression compared to the time before the outbreak of the pandemic, for those who said they were lonely or depressed at the time of the Corona Survey. They relate them to macro indicators of the severity of the pandemic, and to some individual factors. They find that macro factors were somewhat less important than individual factors and that those living alone had a higher risk of increased depression than those living with others after the first COVID-19 wave. However, this might have been expected given the higher incidence of depression among those who live alone before the pandemic. Litwin and Levinsky (2021), use not only SHARE Wave 8 COVID-19 data, but also wave 6 of SHARE which allows them to control for some baseline individual characteristics. They find that face-to-face contact with members of one's social network reduced depression and anxiety during the pandemic, while contacts via phone or electronic means did not. None of those studies consider other LA or HO conditions. Our strategy is somewhat similar to Litwin and Levinsky (2021), but we add one more former wave of SHARE, and we also fully make use of the longitudinal aspect of the data in fixed-effects specifications. We do not just look at the association between LA/HO and mental well-being during the first wave of COVID, but also at associations before the pandemic and at potential changes in such associations resulting from the first wave of the pandemic.

Overall, while feelings of loneliness among the 50+ were slightly higher in June-July 2020 compared to what had been measured by SHARE surveys since 2004, the proportion of respondents that felt sad or depressed decreased from 40 percent in pre-COVID waves to 26 percent in the Corona Survey, and the proportion who had trouble sleeping decreased from 36 percent to 27 percent. Litwin and Levinsky (2021) notice the decrease in depression and quote Reibling et al. (2017) who point out that in Europe people were less depressed during the crisis of 2008. While keeping in mind this somewhat surprising evolution for SHARE respondents as a whole, our focus is on how the first wave of the pandemic changed the association between mental health and LA/HO.

Our main results are the following: First, with whom the elderly live matters. It is well known that (before the COVID-19 pandemic), living alone is associated with worse mental health; that is still the case in the SHARE Corona Survey. However, we find that the relative mental well-being of two particular groups of respondents was markedly different after the first wave of the pandemic. Respondents who were single but living with others (in 80 percent cases those "others" are adult children) improved their mental well-being relative to that of

the population, while the mental well-being of respondents who lived only with a spouse (and no one else) became worse relative to that of the population. For parents in our sample, the presence of an adult child in the household or living in the same building was associated with better mental well-being relative to the population after the first wave of COVID, but not in the years before Covid. During the first wave of the pandemic, children living outside could not visit their parents during lockdowns, or might not visit them for fear of spreading the virus even if allowed to.

Second, where a person lived during the first wave of the COVID-19 pandemic also mattered: depression and loneliness became associated with living in big cities during the pandemic. Moreover this association of city living with mental well-being during the pandemic was primarily driven by respondents living in multi-unit buildings.

The paper proceeds as follows. Section 2 describes the SHARE data and shows some descriptive statistics. In Section 3, we describe our method. Section 4 reports the results of LA and HO association with mental well-being and discusses heterogeneity across gender. Section 5 concludes.

2 Data

2.1 SHARE Data

This study exploits the Survey of Health, Ageing and Retirement in Europe (SHARE).[3] It is a multidisciplinary longitudinal biannual survey providing information on health, socioeconomic and demographic situation of individuals aged 50 or more in Europe and Israel. We keep two regular face-to-face surveys, wave 5 (2013) and wave 6 (2015), and the telephone survey conducted in June-July 2020,[4] SHARE Corona Survey, also often referred to as the SHARE Wave 8 COVID-19 data (Börsch-Supan, 2020i). Scherpenzeel et al. (2020) provide excellent description of the data structure and details on data collection.

Waves 5 and 6 are the last most recent waves providing the variables we need and for which a full representative sample is available.[5] Since in some analysis we control for predetermined health, we keep the 11 countries that participated in the survey since 2010 (wave 4): Belgium, the Czech Republic, Denmark, Estonia, Germany, France, Italy, Slovenia, Spain, Sweden, and Switzerland. The small fraction (1%) of respondents who lived in retirement or nursing homes are left out because their housing conditions and living arrangements are intrinsically different from those who live in the community.

Mental well-being outcomes. Our outcome variables are three indicators of mental health problems: depression, loneliness, and trouble sleeping.[6] We consider as depressed those who

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[3]See Börsch-Supan et al. (2013), Börsch-Supan (2020a), Börsch-Supan (2020b), Börsch-Supan (2020c), Börsch-Supan (2020d), Börsch-Supan (2020e), Börsch-Supan (2020f), Börsch-Supan (2020g) for methodological details.

[4]3% of interviews took place in August (Börsch-Supan, 2020h), we regroup them with July interviews when analyzing seasonal effect.

[5]Wave 7 (2017), focused on people's life histories and does not provide the variables used in our analysis. Wave 8 started at the end of 2019 but had to be interrupted in March 2020 because of the pandemic, so cannot be used either, because of the non-random selection of individuals who participated in both wave 8 and SHARE Corona Survey.

[6]For the COVID sample, we also use feeling nervous or anxious, which is not available in pre-COVID waves.

answer "yes" to the following question, asked in exactly the same fashion in all waves: *"In the last month, have you been sad or depressed? (If participant asks for clarification, say 'by sad or depressed, we mean miserable, in low spirits, or blue')"*. If they answered "yes" to this question, respondents in the SHARE Corona Survey were asked an additional question: *"Has that been more so, less so, or about the same as before the outbreak of Corona?"*. We group the respondents in the SHARE Corona Survey into three categories: not depressed (75% of the sample); depressed but either less so or about the same as before (8%); and depressed and more so than before (17%). For loneliness and trouble sleeping we use the same combination of two questions ("yes/no", "if yes, compare with before the pandemic") to define similar 3-category outcomes for all respondents in the SHARE Corona Survey.[7]

Living arrangements (LA). We define four categories of household structure: living alone ("Alone"), living only with a spouse or a partner ("Couple"), living with a spouse or a partner and someone else ("Couple-with-others"), and living without a spouse or partner but with others ("Single-with-others"). Those "others" are mostly adult children or old parents. Thanks to the unique data structure of SHARE, we can construct a variable indicating the distance of a parent to the nearest child, with also four categories: living in the same household or in the same building, less than 1 km away, from 1 to 25 km, and farther away.

Housing conditions (HO). We use three measures of housing conditions. First, the location: big city, suburbs, large town, small town, and rural area. After a first exploration, we group them into two categories: big city (includes the first three categories) versus rural area (small town or rural area). Second, we use the type of accommodation: single house, row house, flat is small building, flat in large building, flat in high rise, that we also regroup into two categories: single house versus multiple unit buildings. Finally, we consider the number of rooms:[8] fewer than 2, 3, 4, and more than 5.

Socio-economic variables. We use age in three groups ("pre-retired" 50-65, "young retirees" 65-79, and "oldest old" aged 80 or more), gender, and the number of surviving children. We also use three education levels (less than high school, high school or professional education, university), and the ability to make ends meet (four categories, from with difficulty to very easily) as proxies for permanent and current income. We also control for four categories of baseline self-reported health in the previous period:[9] excellent or very good, good, fair, and poor. When we study the impact of the distance to the nearest child, we add the parent's marital state: living with a partner or not.

Table 1 reports descriptive statistics, separately for pre-COVID waves and SHARE Wave 8 COVID-19 data. In total, there are 26437 individuals in COVID sample, and about 91988 wave-individual observations in the longitudinal analysis.

Overall, while feeling of loneliness slightly increases from 24 to 27% from pre-COVID times

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Results are in line with other outcomes and are available upon request.

[7]Feeling of loneliness is coded using three categories. We pool together answers "often" and "some of the time" compared to "hardly ever or never" to get an indicator in line with other mental well-being variables. The results remain the same using three categories instead.

[8]Number of rooms excludes kitchen, bathrooms and hallways and any rooms that are let or sublet as well as boxrooms, cellars, attics etc.

[9]The previous period is the last survey before the wave we use, or the same question or self-reported health "before the outbreak of the pandemic" for respondents in the SHARE Corona Survey.

Table 1: Descriptive statistics before and after COVID

	Pre-COVID (1)	SD	COVID (2)	SD	Difference (1) - (2)	(P-value)
Mental well-being outcomes:						
Depressed	0.403	0.490	0.247	0.431	0.155	0.000
Felt lonely	0.237	0.425	0.266	0.442	-0.029	0.000
Trouble sleeping	0.363	0.481	0.272	0.445	0.091	0.000
Living arrangements:						
Household structure:						
Alone	0.221	0.415	0.258	0.438	-0.037	0.000
Couple	0.551	0.497	0.551	0.497	0.000	0.979
Couple-with-others	0.173	0.379	0.137	0.343	0.037	0.000
Single-with-others	0.055	0.228	0.055	0.227	0.000	0.817
Distance to the nearest child:						
Coreside	0.292	0.455	0.283	0.450	0.009	0.014
< 1 km	0.166	0.372	0.163	0.369	0.003	0.324
1-25 km	0.359	0.480	0.368	0.482	-0.009	0.022
> 25 km	0.183	0.387	0.186	0.389	-0.003	0.325
Housing variables:						
Location:						
Big city	0.372	0.483	0.389	0.488	-0.017	0.000
Rural area	0.628	0.483	0.611	0.488	0.017	0.000
Type of building:						
Multiple units	0.556	0.497	0.557	0.497	-0.001	0.848
Single house	0.444	0.497	0.443	0.497	0.001	0.848
Number of rooms:						
≤ 2 rooms	0.163	0.369	0.170	0.375	-0.007	0.014
3 rooms	0.247	0.432	0.256	0.436	-0.008	0.011
4 rooms	0.251	0.433	0.242	0.429	0.008	0.010
≥ 5 rooms	0.339	0.473	0.332	0.471	0.007	0.056
Controls:						
Female	0.565	0.496	0.579	0.494	-0.013	0.000
50-64	0.412	0.492	0.254	0.435	0.158	0.000
65-79	0.457	0.498	0.545	0.498	-0.089	0.000
80+	0.131	0.337	0.201	0.400	-0.069	0.000
Education:						
Less than high school	0.395	0.489	0.337	0.473	0.058	0.000
High school/Professional	0.384	0.486	0.413	0.492	-0.029	0.000
University	0.221	0.415	0.250	0.433	-0.029	0.000
Ability to make ends meet:						
With great difficulty	0.089	0.284	0.046	0.210	0.042	0.000
With some difficulty	0.244	0.430	0.187	0.390	0.057	0.000
Fairly easily	0.292	0.455	0.376	0.484	-0.084	0.000
Easily	0.375	0.484	0.390	0.488	-0.015	0.000
Number of children:						
Childless	0.092	0.289	0.090	0.287	0.002	0.444
Having at least one child	0.908	0.289	0.910	0.287	-0.002	0.444
Marital status:						
Not living with a partner	0.304	0.460	0.324	0.468	-0.020	0.000
Living with a partner	0.696	0.460	0.676	0.468	0.020	0.000
Baseline self-reported health:						
Very good	0.252	0.434	0.251	0.434	0.001	0.815
Good	0.370	0.483	0.442	0.497	-0.072	0.000
Fair	0.282	0.450	0.242	0.428	0.040	0.000
Poor	0.096	0.295	0.065	0.247	0.031	0.000
Observations	65551		26437			

Note: The list of observed characteristics in the analysis with the SHARE based on waves 5, 6 and SHARE Wave 8 COVID-19 data. Column 1 corresponds with waves 5 and 6. Column 2 is SHARE Wave 8 COVID-19 data. The last column reports the P-value of the null hypothesis about the equalities of the two means.

to the period of the SHARE Corona Survey after the first wave of the pandemic, depression (trouble sleeping), the rate of which was 40% (36%) decreases to 25% (27%).[10] There have

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[10]The rates of depression, loneliness and trouble sleeping had been constant since 2004, the 1st wave of SHARE.

been many reports of mental health problems linked to COVID. Most problems are said to be concentrated among young people, and appeared after the fall of 2020 (Bu, Steptoe, Mak, & Fancourt, 2021). But our finding of a decrease seems puzzling.[11] Litwin and Levinsky (2021) mention the decline in depression and quote Reibling et al. (2017) who find, analyzing data from the European Social Survey, that in Europe depression symptoms decreased between 2006 and 2014, around the 2008 economic crisis. This is in line with Durkheim (1897) who found that in times of wars suicide rates tend to decrease. His explanation is that individuals are united around major national issues that rekindle the sense of belonging to a society. Indeed, data from 21 countries or areas show that there was no increase in suicide in the early months of the COVID-19 pandemic, and even a decrease in 12 of them (Pirkis et al., 2021).[12]

One could also think of a purely seasonal effect, as the SHARE Corona Survey was conducted in June and July 2020. We introduce survey month in our analysis to control for such an effect. Furthermore in June-July of 2020 when the data were collected the lockdowns had ended or the most severe restrictions had been lifted. Finally, all pre-COVID SHARE data were obtained in face-to-face interviews (CAPI) whereas the SHARE Corona Survey was conducted by telephone (CATI). Therefore, we cannot rule out a mode effect. Regarding mode effects for mental well-being, there is limited evidence about CATI and CAPI surveys. Previous studies mainly compare CATI or CAPI versus self-administered mail-in or web surveys. One exception is Cernat, Couper, and Ofstedal (2016). From a quasi-experiment on the Health and Retirement Study they find that answers from CATI are modestly more positive regarding depression relative to CAPI. However, by far, the largest differences are between personal interviews and self-administered modes.[13]

More than a half of the 50+ live in couple (with a spouse or partner), about one out of four lives alone, slightly more in SHARE Wave 8 COVID-19 data; 16 percent live with a spouse or partner and someone else (15% with a spouse and at least one child and 1% with a spouse and a parent or sibling), slightly less during SHARE Wave 8 COVID-19 data, and the remaining 6 percent live with someone who is not a spouse or partner (4% with a child and 1% with a parent or sibling). Less than 10 percent do not have a child. Note that many of the parents in our sample are elderly and the children with whom they live are adult children. For about 30 percent of parents, the nearest child lives in the same household or in the same building. The most frequent distance is between 1 and 25 km.

More than 60 percent of 50+ live in a rural area or a village and 56 percent not in a single house. As for number or rooms, 17% have only one or two, 33% five or more, the same in all waves. In the final sample, there are slightly more women than men because of longer females' longevity. The mean age is 69 years old. On average the respondents are three years older (71) in the COVID sample than in former waves (68). This is because the so-called refresher sample

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[11]The decrease in depression rates during the European summer 2020 was also found in other surveys. For instance, according to OECD (2021), the depression rate in France decreased from 20% at the end of March 2020, to 11% in June-July 2020, a large drop, and peaked again at 23% in November. In the UK, depression levels overall were higher than usual reported averages, but also showed a marked dip during the Summer of 2020 (Bu et al., 2021, p.17).

[12]Prevalence of mental disorders and suicides did not change significantly in Norway (if anything it rather decreased (Knudsen et al., 2021). Suicides rather decreased in the US too (Sanchez, 2021).

[13]The telephone survey was much shorter than the face-to-face interview. Length of interview and position of an item within the questionnaire are (potentially) part of the mode effect (Clark & Vicard, 2007).

that was drawn for the regular wave 8 could not be fully used because of the pandemic, which stopped the face-to-face survey in March 2020. Hence, our COVID sample is less representative of the young old than of the oldest old. Less than 10 percent reported poor health before the outbreak of COVID-19 or in the previous wave.

3   Methodology

We start by using only SHARE Corona Survey. For each of our three mental well-being outcomes, i.e. depression, loneliness and trouble sleeping, the respondent can be in one of three states. For instance for depression: not depressed during last month; depressed but less so or about the same as before the pandemic; or depressed and more so than before the outbreak of the pandemic. We run multinomial probit models. This gives a first indication of the associations between LA/HO conditions and mental well-being during the first wave of COVID, but also of the links of depression, loneliness and trouble sleeping with age, gender, education, our income proxy, health preconditions, and also whether the interview was conducted in June or July, or in a country badly hit by the first wave or not.[14] The results are in Table 2. Next, we consider the subsample of parents, replacing household structure by the distance to the nearest child. Appendix B, Table B.1 reports the results.

Then, in our main analysis we study whether the associations we find between LA/HO and mental well-being in the SHARE Corona Survey differ from former waves. Accordingly, we switch from using the three-category outcome which combined the two questions of the SHARE Corona Questionnaire, to the binary outcome obtained from the mental health questions common to SHARE Corona Questionnaire and all the previous waves of SHARE.

We make full use of the longitudinal nature of the data, and add individual fixed effects (Tables 3 - 4, Columns 2, 4 and 6):

$$y_{it} = \beta_1 ho_{it} + \beta_2 COVID_t \cdot ho_{it} + \beta_3 COVID_t + \gamma X_{it} + \mu_i + \theta_t + \nu_{j(i)t} + \varepsilon_{it} \qquad [1]$$

where y_{it} is an indicator of being depressed, having felt lonely or had trouble sleeping. $COVID_t$ equals one for wave of June-July 2020 and 0 otherwise. ho_{it} is one of the five LA/HO variables of interest: household structure, distance to the nearest child, location, type of building or number of rooms. The full list of other controls, X_{it}, depends on the LA or HO variable we analyse. We always control for age groups, previous self-reported health, education, ability to make ends meet, gender, number of children, month of interview and country fixed effects. When we study LA, we add controls for HO (location, number of rooms and type of building); in case of the distance to the nearest child, we further control for whether the parent lives with a partner or not. For the analysis of the impacts of HO, we control for LA (household structure).[15] θ_t is a wave 6 dummy. μ_i is the individual effects and $\nu_{j(i)t}$ is the country-wave interaction. ε_{it} is the error term. We cluster standard errors at the individual level to allow for correlation over time

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[14]We also replace country dummies by three indicators of COVID impact and stringency: number of deaths per capita, number of cases per capita, and lockdown policies in each country. See Appendix A, Table A.1.

[15]We control for the type of building if the RHS variable of interest is area of living; area of living if we are analyzing the effect of the type of building; both (area and type of building) when we focus on the number of rooms.

for the same individual.[16]

We also present the results from alternative specifications which do not control for individual fixed effects, μ_i, in Columns 1, 3 and 5 in Tables 3 - 4.

The coefficient β_3 captures the overall impact of the pandemic on mental health. Coefficients in β_1 capture the general associations between mental health and LA/HO conditions before the outbreak of the virus. The coefficients in β_2 are our main focus and capture the differential association between LA/HO and mental health during the first wave of the COVID-19 pandemic. Coming back to the potential effect of the change in the mode of interview (from face-to-face long interview, to a shorter telephone survey), note that for the identification of β_2 we do not require an assumption that there are no mode effects, but rather that there are no interactions of mode and LA/HO variables, nor of seasonal effects and LA/HO variables.

4   Results

First, we present the results for the SHARE Corona Survey. Next, we discuss longitudinal analysis.

4.1   COVID Sample

Table 2 reports results of the multinomial probits which use only the SHARE Wave 8 COVID-19 data.

As others before, we find that living alone was associated with worse mental health. Compared to Single-with-others,[17] to Couple and to Couple-with-others, individuals who live Alone had a higher probability to feel sad or depressed, by 5.6 ppt, 4.7 ppt and 5.7 ppt respectively; a higher probability of feeling lonely by 13.8 ppt, 26 ppt and 29.8 ppt; and a higher probability of having trouble sleeping by 2.4 ppt, 1.8 ppt and 3.1 ppt (see Columns 1, 3 and 5). Furthermore, since the outbreak of the pandemic those who live alone were 4 ppt (7 ppt) more likely to have become more depressed (or more lonely) than single individuals who did not live alone (Columns 2, 4). There is no significant pattern for problems with sleeping.

Moreover, while living in a couple is associated with better mental well-being in normal times, we find that since the outbreak of Corona individuals living with their spouse or with spouse and someone else were, on average, 2-3 ppt more likely to have become more depressed than singles living with others. There are no such patterns for loneliness (couples, especially when living with others were less likely to have become more lonely compared to singles, alone or with others) and trouble sleeping.

Living in a big city or suburbs increased the probability of becoming more depressed and more lonely between the outbreak of the pandemic and June-July 2020.[18] The effect of the type of building and number of rooms is not significant.[19]

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[16]The results remain the same if we use robust standard errors.

[17]Couples and singles who live with others in 80 percent of cases live with their children.

[18]Chetty et al. (2016) show that large differences in US life expectancy across areas can be observed for the poor, but not for the rich. "Where you live matters much more if you are poor than if you are rich". If we separate rich and poor defined from ability to make ends meet, the city effect on depression is the same for both (not shown).

[19]Only living in a high rise increased depression in a specification where types of buildings are detailed (not

Table 2: Average marginal effect on mental well-being in June-July 2020

	Depressed		Felt lonely		Trouble sleeping	
	Not	More	Not	More	Not	More
	(1)	(2)	(3)	(4)	(5)	(6)
Reference categories: Single-with-others, rural area, single house, 5 or more rooms						
Alone	-0.0563***	0.0397***	-0.138***	0.0676***	-0.0241**	0.00992
	(0.0116)	(0.00948)	(0.0133)	(0.00915)	(0.0122)	(0.00731)
Couple	-0.00935	0.0294***	0.122***	-0.0154*	-0.00596	0.00680
	(0.0110)	(0.00904)	(0.0124)	(0.00836)	(0.0116)	(0.00695)
Couple-with-others	0.00136	0.0213**	0.160***	-0.0453***	0.00678	0.000362
	(0.0125)	(0.0104)	(0.0133)	(0.00888)	(0.0133)	(0.00779)
Big city	-0.0238***	0.0174***	-0.0173***	0.0124***	0.00328	0.00549
	(0.00556)	(0.00488)	(0.00555)	(0.00413)	(0.00579)	(0.00361)
Multiple units	0.00227	0.000966	0.0165***	-0.00404	-0.00958	0.0000639
	(0.00571)	(0.00498)	(0.00571)	(0.00425)	(0.00598)	(0.00367)
≤ 2 rooms	0.00480	0.00448	0.00794	0.000625	0.00348	0.00190
	(0.00886)	(0.00776)	(0.00877)	(0.00648)	(0.00924)	(0.00562)
3 rooms	-0.00341	0.00732	0.00508	0.00166	0.000338	0.0105**
	(0.00735)	(0.00639)	(0.00732)	(0.00545)	(0.00767)	(0.00472)
4 rooms	-0.00447	0.0159***	0.00715	0.00625	0.000990	0.00891**
	(0.00697)	(0.00610)	(0.00697)	(0.00520)	(0.00729)	(0.00443)
Female	-0.118***	0.0921***	-0.0721***	0.0508***	-0.0937***	0.0314***
	(0.00513)	(0.00444)	(0.00524)	(0.00379)	(0.00542)	(0.00330)
65-79	0.0136**	-0.0159***	0.00127	0.00145	0.0148**	-0.0232***
	(0.00647)	(0.00575)	(0.00649)	(0.00484)	(0.00676)	(0.00453)
80+	-0.00970	-0.00921	-0.0338***	0.0118*	-0.00387	-0.0348***
	(0.00843)	(0.00737)	(0.00835)	(0.00618)	(0.00877)	(0.00540)
High school	0.0130**	-0.00684	0.0133**	0.000987	0.00889	0.0102**
	(0.00647)	(0.00564)	(0.00642)	(0.00468)	(0.00680)	(0.00407)
University	-0.00733	0.00991	0.00896	0.00933	-0.00216	0.0263***
	(0.00773)	(0.00684)	(0.00758)	(0.00567)	(0.00804)	(0.00516)
With some difficulty	0.0776***	-0.0589***	0.0493***	-0.0276**	0.0709***	-0.0389***
	(0.0146)	(0.0131)	(0.0143)	(0.0111)	(0.0146)	(0.0102)
Fairly easily	0.138***	-0.0995***	0.117***	-0.0591***	0.111***	-0.0665***
	(0.0143)	(0.0128)	(0.0139)	(0.0109)	(0.0143)	(0.0100)
Easily	0.155***	-0.110***	0.144***	-0.0771***	0.112***	-0.0691***
	(0.0150)	(0.0134)	(0.0146)	(0.0113)	(0.0150)	(0.0105)
Having a child	-0.0230***	0.0283***	-0.000674	0.0127**	-0.00166	0.0118**
	(0.00866)	(0.00727)	(0.00864)	(0.00589)	(0.00941)	(0.00530)
Good	-0.0625***	0.0356***	-0.0617***	0.0215***	-0.0607***	0.0178***
	(0.00596)	(0.00518)	(0.00621)	(0.00439)	(0.00639)	(0.00358)
Fair	-0.178***	0.111***	-0.146***	0.0685***	-0.197***	0.0712***
	(0.00794)	(0.00698)	(0.00796)	(0.00592)	(0.00843)	(0.00529)
Poor	-0.370***	0.194***	-0.215***	0.0929***	-0.327***	0.131***
	(0.0136)	(0.0123)	(0.0131)	(0.0102)	(0.0138)	(0.0104)
Sweden	0.0645***	-0.00980	-0.0271*	0.0593***	0.0926***	0.00375
	(0.0150)	(0.0131)	(0.0150)	(0.0127)	(0.0148)	(0.00929)
Spain	0.000363	0.0606***	0.0447***	-0.0315***	0.0635***	0.0486***
	(0.0144)	(0.0129)	(0.0129)	(0.00943)	(0.0138)	(0.00953)
Italy	-0.0247*	0.0859***	-0.132***	0.0873***	0.0437***	0.0666***
	(0.0127)	(0.0114)	(0.0126)	(0.0105)	(0.0124)	(0.00842)
France	-0.0143	0.0491***	-0.0355***	0.00740	-0.0220	0.0563***
	(0.0136)	(0.0120)	(0.0129)	(0.00985)	(0.0140)	(0.00927)
Denmark	0.103***	-0.0415***	0.0748***	-0.00580	0.0810***	-0.0134*
	(0.0132)	(0.0112)	(0.0126)	(0.0102)	(0.0136)	(0.00760)
Switzerland	0.0338**	0.0208*	0.0117	0.0262**	0.0808***	0.00902
	(0.0140)	(0.0124)	(0.0135)	(0.0110)	(0.0137)	(0.00873)
Belgium	0.00551	0.0655***	-0.0403***	0.0699***	-0.0182	0.0624***
	(0.0119)	(0.0106)	(0.0115)	(0.00955)	(0.0122)	(0.00800)
Czech Republic	0.0673***	-0.0519***	-0.0226*	-0.0463***	-0.0142	-0.00276
	(0.0123)	(0.0100)	(0.0122)	(0.00840)	(0.0132)	(0.00724)
Slovenia	0.114***	-0.0703***	0.0396***	-0.0437***	0.0220*	-0.00826
	(0.0117)	(0.00952)	(0.0117)	(0.00837)	(0.0128)	(0.00685)
Estonia	0.107***	-0.0418***	0.0608***	-0.0694***	-0.0332***	-0.0292***
	(0.0108)	(0.00910)	(0.0105)	(0.00726)	(0.0120)	(0.00573)
July	0.0156***	-0.0159***	0.00880*	-0.0125***	0.00940*	-0.00124
	(0.00516)	(0.00450)	(0.00513)	(0.00378)	(0.00541)	(0.00334)
Log likelihood	-17073.049		-17416.497		-18171.002	
N	26213		26179		26254	

Source: SHARE Wave 8 COVID-19 data. Reference categories are male, 50-64 years old, less than high school, with great difficulty ends meet, in very good health before the outbreak, Germany, June.

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shown). However when living in city is interacted with living in an apartment (rather than a single house) its effect of depression is nearly doubled (from 1.7 to 3.1 ppt).

Together with LA/HO effects, individual characteristics also matter. For instance, the 11 percent of the 50+ who only make ends meet with great difficulty had a 15 ppt (14 ppt and 11 ppt) higher probability to be depressed (lonely and to have trouble sleeping) than those who make ends meet very easily (Columns 1, 3, and 5). It also increased the probability to develop more mental health problems since the outbreak (Columns 2, 4, and 6).

On a macro level, country effects are large. Individuals from the four more badly hit countries based on excess mortality between March and June 2020, Italy, Spain, Belgium and France, have a 5 to 9 ppt more chances to have become more depressed, lonely and have more problems with sleeping during the pandemic. In Appendix A, Table A.1 confirms the same result replacing country effects with COVID-related measures. A higher number of deaths per capita due to COVID and longer stay-at-home recommendations increase the probability of being in a worse mental state during the first wave of the pandemic.

We repeat this analysis for the sample of parents. Appendix B, Table B.1 shows that core-siding or living in the same building with a child had a mitigating impact on all three measures of mental health during the first wave of the pandemic. One potential explanation could be due to a larger change in lifestyle or frustration generated by strict confinement measures for parents who were not allowed to meet their children.

4.2 Longitudinal Analysis: Living Arrangement

We now turn to longitudinal analysis. Table 3 documents findings for household structure (*Panel I*) and distance to the nearest child (*Panel II*). The three outcome variables are the mental well-being indicators. Even columns (2, 4, 6) show our preferred specification which fully exploits the panel data structure and controls for individual fixed effects. Odd columns (1, 3, 5) report the pooled analysis without individual fixed effects.

For singles (those without a partner), living with someone else became more important to be protected from the risk of mental health problems during the first wave of the pandemic. Before the outbreak of Corona, the probability of feeling sad or depressed or having trouble sleeping was similar whether single individuals lived alone or with others, while the probability of feeling lonely was larger for single individuals who lived alone (see *Panel I*, Columns 2 and 6). The first wave of the pandemic changed this. Being single increased the probability of being depressed by about 7 ppt compared to singles-with-others, which corresponds with 20% of the mean outcome variable (*Panel I*, Column 2). The probability of having trouble sleeping also increased for singles compared to singles-with-others by 4 ppt or 12% of the mean value (*Panel I*, Column 6). Given the overall decrease in depression and sleep problems in June-July 2020 compared to previous waves, the total impact of the 1st wave of the COVID remains that of an increase in mental well-being independently of the household structure. Regarding feeling lonely, the differential effect is similar to other mental well-being indicators: it was more detrimental to live alone compared to singles with others during the first wave of the COVID-19 pandemic than before. The risk increased by roughly 4 ppt or 16% of the mean outcome variable (*Panel I*, Column 4). Accordingly, during the pandemic, the loneliness penalty of living alone widens in Europe, and, as also found by d'Hombres, Barjaková, and Schnepf (2021), not living alone is strongly associated with less loneliness in pre-COVID time.

Table 3: Impact of living arrangement on mental well-being in June-July 2020

	Depressed		Felt lonely		Trouble sleeping	
	Multiwave (1)	FE (2)	Multiwave (3)	FE (4)	Multiwave (5)	FE (6)
Panel I: Household structure						
Reference group: Single-with-others						
Alone	-0.000953	0.0134	0.102***	0.0617***	-0.00464	-0.0345*
	(0.00980)	(0.0199)	(0.00971)	(0.0193)	(0.00994)	(0.0195)
Couple	-0.0498***	-0.0999***	-0.165***	-0.263***	-0.00987	-0.0447**
	(0.00928)	(0.0213)	(0.00900)	(0.0203)	(0.00939)	(0.0205)
Couple-with-others	-0.0389***	-0.0827***	-0.170***	-0.273***	-0.0195*	-0.0296
	(0.0101)	(0.0221)	(0.00953)	(0.0208)	(0.0101)	(0.0211)
Alone × COVID	0.0596***	0.0720***	0.0309*	0.0379*	0.0294*	0.0419**
	(0.0154)	(0.0197)	(0.0160)	(0.0194)	(0.0157)	(0.0198)
Couple × COVID	0.0605***	0.113***	0.0251*	0.0439**	0.0182	0.0461**
	(0.0145)	(0.0186)	(0.0149)	(0.0182)	(0.0148)	(0.0188)
Couple-with-others × COVID	0.0360**	0.0742***	-0.00888	0.000818	0.0194	0.0307
	(0.0160)	(0.0210)	(0.0159)	(0.0198)	(0.0163)	(0.0211)
COVID	-0.174***	-0.262***	0.0423**	0.0308	-0.0944***	-0.120***
	(0.0226)	(0.0273)	(0.0200)	(0.0241)	(0.0225)	(0.0262)
Individual FE	No	Yes	No	Yes	No	Yes
Mean dep. var.	.358	.3544	.2456	.2445	.3373	.3353
R^2	0.112	0.0542	0.152	0.0352	0.0861	0.0199
N	91988	87165	91929	87113	92085	87236
Panel II: Distance to the nearest child, Sample of parents						
Reference group: A child in the same household or building						
< 1 km	0.00531	-0.0128	0.0163***	0.0102	0.00731	-0.00987
	(0.00710)	(0.0170)	(0.00608)	(0.0147)	(0.00722)	(0.0165)
1-25 km	-0.00253	-0.00447	0.0193***	-0.0105	-0.00215	-0.0163
	(0.00596)	(0.0147)	(0.00504)	(0.0126)	(0.00602)	(0.0139)
> 25 km	0.0138*	-0.00953	0.0402***	0.00972	-0.00463	-0.0153
	(0.00720)	(0.0194)	(0.00608)	(0.0161)	(0.00722)	(0.0179)
< 1 km × COVID	0.0349***	0.0645***	0.0503***	0.0445***	0.0114	0.0368**
	(0.0115)	(0.0159)	(0.0108)	(0.0140)	(0.0118)	(0.0156)
1-25 km × COVID	0.0394***	0.0564***	0.0377***	0.0411***	0.0142	0.0349***
	(0.00947)	(0.0132)	(0.00882)	(0.0115)	(0.00966)	(0.0127)
> 25 km × COVID	0.0181	0.0567***	0.0286***	0.0348**	0.0222*	0.0423***
	(0.0113)	(0.0154)	(0.0106)	(0.0136)	(0.0116)	(0.0151)
COVID	-0.142***	-0.198***	0.0285*	0.0342	-0.0946***	-0.111***
	(0.0214)	(0.0263)	(0.0170)	(0.0211)	(0.0215)	(0.0248)
Individual FE	No	Yes	No	Yes	No	Yes
Mean dep. var.	0.3608	0.3574	0.2365	0.2357	0.3431	0.3411
R^2	0.110	0.0481	0.129	0.0275	0.0860	0.0189
N	70265	66541	70218	66500	70339	66591

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We cluster standard errors at the individual level. All specifications control for three categories of age, previously reported health, number of children, ability to make ends meet, location, type of building, the month of interview, country fixed effects and country-wave interactions. In *Panel II*, we control for living with a partner indicator. Columns 1, 3 and 5 control further for education, female, and country fixed effects. The sample includes Belgium, the Czech Republic, Denmark, Estonia, Germany, France, Italy, Slovenia, Spain, Sweden, and Switzerland.

Our results reveal the protective effect of other household members for singles during the first wave of COVID-19 pandemic. This is in line with Hamermesh (2020). In his model; a negative impact on happiness among singles aged above 30 is expected even in the absence of

further income loss due to the economic crisis. Our sample includes only 50+. Accordingly, they were more likely to be outside of the labor force, and the confinement of Spring 2020 may have been less difficult for them because their income was perhaps less impacted. Nevertheless, less contacts, resulted in relatively more mental health problems.[20]

In pre-COVID waves, couples and couples living with others reported the lowest prevalence of depression and loneliness. After the first wave of the pandemic, the relative risk of depression dramatically increased by 11 ppt or 30% of the mean outcome for those living only with their spouse (couples) and by 7 ppt or 20% for those who lived with a spouse and with others (*Panel I*, Column 2), compared to singles-with-others. The findings for loneliness and trouble sleeping also confirm the protective effect of living with other persons during the pandemic. Couples who were not living only with their spouse, do not report a higher risk of loneliness or problems with sleeping compared to other groups during the pandemic. This is different for those living only with their spouse who experienced an increase in feeling lonely by 4 ppt or 18% and trouble sleeping by 4.6 ppt or 14% compared to singles-with others, and by 4 ppt or 18% loneliness and by 1.5 ppt or 4% trouble sleeping relative to couples-with-others after the first wave of the pandemic (*Panel I*, Columns 4 and 6).

These findings contrast with the prediction in Hamermesh (2020), who shows an increase in life satisfaction among married individuals with additional time spent together. During the first wave of the COVID-19 pandemic, we document that it was not the case for the elderly couples.

When we restrict the analysis to the sample of parents, we find that the distance to the nearest child matters during the first wave of the pandemic (see Table 3, *Panel II*). Parents not living with a child or not in the same building report a significant increase in the prevalence of depression, loneliness and sleep problems, compared to other parents. Interestingly, the size of impact does not vary with the distance to the nearest child once that child is not in the same building, which can be in line with the strict stay-at-home restrictions and contamination fear in Spring 2020. Accordingly, for the first time, having a child in the same household or in the same building became more crucial to keep face-to-face contacts with children that seem very important for mental well-being. In pre-COVID time, the distance to a child was not related to parental mental well-being in the model with fixed effects. Regarding the magnitude, after the first wave of the pandemic, not living with a child or having one in the same building, reduced the overall decrease in sadness or depression by around 6 ppt (15% of the mean outcome) and reduced the overall decline in sleep problems by 4 ppt (10%). It increased loneliness by 3 to 4 ppt (17%) relative to coresiding (Columns 2, 4 and 6).[21]

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[20]The results highlighted above are robust to the functional form and a non-linear analysis. Online Appendix C, Fig. C.1a, C.1b and C.1c show changes in the average marginal impact of household structure on mental health before and after the first wave of pandemic.

[21]Appendix C, Fig. C.2a, C.2b and C.2c document these changes using the non-linear probit specification. There, we split the sample into before and after the pandemic and compare the average marginal effect of distance to the nearest child on mental health outcomes.

4.3 Longitudinal Analysis: Housing Conditions

The location where one lives had a measurable effect on mental well-being during the first wave of the pandemic (see Table 4). There is a clear differential higher prevalence of mental health problems in denser places like big cities, their suburbs and large towns than in small towns or rural areas. *Panel I* documents that respondents from big cities experience a statistically significant increase in the prevalence of depression (increase of 2.2 ppt, or 6%) and of loneliness (increase of 2.4 ppt, or 10%) compared to individuals in rural areas. The result is robust to the choice of controls and inclusion of individual fixed effects. Yet, the total impact of the 1st wave of the COVID remains a decrease in depression and trouble sleeping. There is no statistically significant differential effect of living in the city on trouble sleeping which could be in line with a drop in air and noise pollution during lockdowns.

Table 4: Impact of housing conditions on mental well-being in June-July 2020

	Depressed		Felt lonely		Trouble sleeping	
	Multiwave (1)	FE (2)	Multiwave (3)	FE (4)	Multiwave (5)	FE (6)
Panel I: Location						
Reference group: Rural area						
Big city	0.00583	-0.0103	-0.00126	-0.00499	0.000269	-0.0113
	(0.00428)	(0.00853)	(0.00365)	(0.00734)	(0.00430)	(0.00812)
Big city × COVID	0.0140**	0.0222***	0.0146**	0.0240***	-0.00253	-0.00432
	(0.00641)	(0.00803)	(0.00598)	(0.00709)	(0.00645)	(0.00773)
COVID	-0.123***	-0.173***	0.0599***	0.0601***	-0.0733***	-0.0765***
	(0.0180)	(0.0211)	(0.0141)	(0.0168)	(0.0176)	(0.0191)
Individual FE	No	Yes	No	Yes	No	Yes
Mean dep. var.	0.3580	0.3544	0.2456	0.2445	0.3373	0.3353
R^2	0.111	0.0531	0.152	0.0350	0.0861	0.0197
N	91988	87165	91929	87113	92085	87236
Panel II: Location and type of building						
Big city	0.0167**	-0.00358	0.00452	-0.00358	0.0102	-0.00352
	(0.00703)	(0.0115)	(0.00558)	(0.00947)	(0.00701)	(0.0108)
Multiple units	0.00801	0.0205**	0.000711	-0.0113	0.00486	0.0124
	(0.00506)	(0.00826)	(0.00428)	(0.00690)	(0.00508)	(0.00778)
Big city × Multiple units	-0.0174**	-0.0119	-0.0107	-0.00295	-0.0140	-0.0120
	(0.00865)	(0.0134)	(0.00713)	(0.0113)	(0.00865)	(0.0129)
Big city × COVID	-0.00700	0.00000738	0.0181*	0.0158	-0.0165	-0.0247*
	(0.0107)	(0.0138)	(0.00980)	(0.0118)	(0.0108)	(0.0131)
Multiple units × COVID	-0.0151*	-0.0273***	-0.0140*	-0.0145	0.00692	-0.00574
	(0.00803)	(0.0103)	(0.00753)	(0.00904)	(0.00820)	(0.00999)
Big city × Multiple units × COVID	0.0345**	0.0407**	0.000160	0.0167	0.0167	0.0299*
	(0.0135)	(0.0174)	(0.0126)	(0.0151)	(0.0136)	(0.0166)
COVID	-0.117***	-0.163***	0.0659***	0.0656***	-0.0765***	-0.0746***
	(0.0183)	(0.0215)	(0.0144)	(0.0171)	(0.0180)	(0.0195)
Individual FE	No	Yes	No	Yes	No	Yes
R^2	0.111	0.0533	0.152	0.0350	0.0861	0.0197
N	91988	87165	91929	87113	92085	87236

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We cluster standard errors at the individual level. All specifications control for three categories of age, household structure, previously reported health, number of children, ability to make ends meet, location, type of building, the month of interview, country fixed effects and country-wave interactions. Columns 1, 3 and 5 control further for education, female, and country fixed effects. The sample includes Belgium, the Czech Republic, Denmark, Estonia, Germany, France, Italy, Slovenia, Spain, Sweden, and Switzerland.

Living in a single house rather than in a multi-unit building does not differently impact

mental well-being (see Appendix D, Table D.1, *Panel I*). However, the interaction between location and type of building becomes important during the pandemic. *Panel II* in Table 4 documents a significant increase by about 4 ppt in depression and 3 ppt in trouble sleeping among individuals in multi-unit buildings in cities relative to respondents in single houses in cities. Furthermore, it shows that, for respondents in multi-unit buildings, the prevalence of depression after the pandemic increased by 7 ppt for those living in cities relative to those living in rural areas. In our sample, 73 percent of all individuals from big cities live in apartments. There are two hypotheses in line with this finding. First, higher depression among urban residents in multi-unit buildings can be due to increased perceived risk of contagion associated with having more neighbors. Second, the governments imposed the mobility restrictions and closure of public places that affect relatively more urban than rural residents. Together with limited space in apartments, these restrictions resulted in a dramatic change in lifestyle for urban residents in apartments. By contrast those with a larger private space in houses could still enjoy relatively higher freedom of movement, possibility of gardening and less reduced opportunity to exercise. This is in line with the fact that physical exercise impacts depression and mental health. Previous literature have shown the mediating impact of outdoor activities: McDowell, Dishman, Hallgren, MacDonncha, and Herring (2018) (for the elderly in Ireland), Bu et al. (2020) (younger in the UK) and Giuntella, Hyde, Saccardo, and Sadoff (2021) (adults in the US). We do not find evidence for changes in loneliness for such location and type of building interaction.

Next, we study associations between the number of rooms and mental health (see *Panel II* in Table D.1, Appendix D), but no clear patterns emerge.

Finally, we looked at heterogeneity across gender in the impact of the pandemic on mental well-being through the LA and HO channels. The only statistically significant and large result is that the negative impact of living in big cities on depression and loneliness, compared to rural areas in pre-COVID time, is driven by women (Appendix E). The difference between women in cities and rural areas compared to men may reflect a relatively more dramatic change in women's lifestyles due to shut down or because women are more likely to perceive COVID-19 as dangerous and to comply with the lockdown restrictions (Galasso et al., 2020).

We also study heterogeneity across countries depending on the excess mortality from March to June 2020. We divide the sample in two groups: badly hit countries with excess mortality above 14%, Belgium, Italy, Spain, France and Sweden; and less hit countries, namely the Czech Republic, Denmark, Estonia, Germany, Slovenia, and Switzerland.[22] We do not find any suggestive evidence for differences across countries in our LA and HO effects (not shown).

5   Conclusion

While the reaction of governments facing the COVID-19 pandemic was to isolate people so they did not get infected, forcing them to live like Robinson on his island, this created differences between citizens according to with whom they lived and where they lived. This is the question we explored in this paper.

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[22]John Hopkins deaths/inhabitants and the Google percent change in mobility support the same grouping.

We used a special wave of SHARE data conducted in Europe in June-July 2020 after the first wave of the pandemic as well as data from previous waves. In the first part of this study, we rely only on the Wave 8 COVID-19 data and analyse the determinants of three mental well-being measures and their evolution since the beginning of the Corona outbreak. Next, we check if such relationships have always been present or are new to the COVID-19 pandemic, pooling Wave 8 COVID-19 data with former waves of SHARE. We find that indeed associations of some aspects of LA and HO with mental health changed in 2020.

First, we find that those living alone experienced a large and significant increase in mental health problems relative to singles living with others. Couples, those living with only a spouse and no children also suffered compared to singles with others. Living in a city became detrimental, especially in apartments. We do not only show that LA and housing conditions had an influence during the pandemic, but also document patterns years before the pandemic, identifying a pure COVID effect.

As for why, contrary to loneliness, and contrary to intuitive expectations, depression and trouble sleeping were lower in May-June 2020 (the "last month" referred to in the question) than in 2013-2015, it may have been because of the relief felt by respondents who believed the pandemic had stopped. It is also in line with what many have found about times of wars, and their strengthening effect of the feeling of community. We know now that the belief that the pandemic was over was a misbelief. Further studies will hopefully help to solve what remains a puzzle.

References

Atzendorf, J., & Gruber, S. (2021). The mental well-being of older adults after the first wave of covid-19. *MEA Discussion Paper No. 04-2021*.

Banks, J., & Xu, X. (2020). The mental health effects of the first two months of lockdown during the covid-19 pandemic in the uk. *Fiscal Studies*, *41*, 685-708. doi:10.1111/1475-5890.12239

Béland, L., Brodeur, A., Mikola, D., & Wright, T. (2020). The short-term economic consequences of covid-19: Occupation tasks and mental health in canada. *IZA Discussion Paper N 13254*.

Bertoni, M., Celidoni, M., Bianco, C. D., & Weber, G. (2021). How did European retirees respond to the COVID-19 pandemic? *Economics Letters*, *203*, 109853. doi:10.1016/j.econlet.2021.109853

Börsch-Supan, A. (2020a). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 1. Release version: 7.1.0. SHARE-ERIC. Data set.
   doi:10.6103/SHARE.w1.710

Börsch-Supan, A. (2020b). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 2. Release version: 7.1.0. SHARE-ERIC. Data set.
   doi:10.6103/SHARE.w2.710

Börsch-Supan, A. (2020c). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 3 - SHARELIFE. Release version: 7.1.0. SHARE-ERIC. Data set.
   doi:10.6103/SHARE.w3.710

Börsch-Supan, A. (2020d). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 4. Release version: 7.1.0. SHARE-ERIC. Data set.
   doi:10.6103/SHARE.w4.710

Börsch-Supan, A. (2020e). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 5. Release version: 7.1.0. SHARE-ERIC. Data set.
   doi:10.6103/SHARE.w5.710

Börsch-Supan, A. (2020f). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 6. Release version: 7.1.0. SHARE-ERIC. Data set.
   doi:10.6103/SHARE.w6.710

Börsch-Supan, A. (2020g). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 7. Release version: 7.1.1. SHARE-ERIC. Data set.
   doi:10.6103/SHARE.w7.711

Börsch-Supan, A. (2020h). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8. COVID-19 survey 1 interview date. Release version: 0.0.1. beta SHARE-ERIC. Data set.
   doi:10.6103/SHARE.w8caintdbeta.001

Börsch-Supan, A. (2020i). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8. COVID-19 survey 1. Release version: 0.0.1. beta SHARE-ERIC. Data set.
   doi:10.6103/SHARE.w8cabeta.001

Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J., Malter, F., ... Zuber, S. (2013). Data resource profile: the Survey of Health, Ageing and Retire-

ment in Europe (SHARE). *International journal of epidemiology*, *42*(4), 992–1001. doi:10.1093/ije/dyt088

Brodeur, A., Clark, A. E., Fleche, S., & Powdthavee, N. (2021). Covid-19, lockdowns and well-being: Evidence from google trends. *Journal of Public Economics*, *193*, 104346. doi:10.1016/j.jpubeco.2020.104346

Bu, F., Steptoe, A., Mak, H. W., & Fancourt, D. (2020). Time-use and mental health during the covid-19 pandemic: A panel analysis of 55,204 adults followed across 11 weeks of lockdown in the uk. *medRxiv*. doi:10.1101/2020.08.18.20177345

Bu, F., Steptoe, A., Mak, H. W., & Fancourt, D. (2021). Covid-19 social study, results release 28. *Department of Behavioural Science & Health*.

Cernat, A., Couper, M. P., & Ofstedal, M. B. (2016). Estimation of mode effects in the health and retirement study using measurement models. *Journal of Survey Statistics and Methodology*, *4*, 501-524.

Chetty, R., Stepner, M., Abraham, S., Lin, S., Scuderi, B., Turner, N., . . . Cutler, D. (2016). The association between income and life expectancy in the united states, 2001-2014. *Jama*, *315*(16), 1750–1766.

Clark, A. E., & Vicard, A. (2007). Conditions de collecte et santé subjective: une analyse sur données européennes. *Economie et statistique*, *403*(1), 143–163.

d'Hombres, B., Barjaková, M., & Schnepf, S. V. (2021). Loneliness and social isolation: An unequally shared burden in Europe. *IZA Discussion Paper No. 14245*.

Durkheim, E. (1897). Le suicide, paris: Felix alcan. *Harris, KM, McLean, JP, & Sheffield, J.[translated by Spaulding, JA, Simpson G. 1951]*.

Galasso, V., Pons, V., Profeta, P., Becher, M., Brouard, S., & Foucault, M. (2020). Gender differences in covid-19 attitudes and behavior: Panel evidence from eight countries. *Proceedings of the National Academy of Sciences of the United States of America*, *117*, 27285-27291. doi:10.1073/pnas.2012520117

Giuntella, O., Hyde, K., Saccardo, S., & Sadoff, S. (2021). Lifestyle and mental health disruptions during covid-19. *Proceedings of the National Academy of Sciences of the United States of America*, *118*. doi:10.1073/pnas.2016632118

Hamermesh, D. S. (2020). Life satisfaction, loneliness and togetherness, with an application to covid-19 lock-downs. *Review of Economics of the Household*, *18*, 983-1000. doi:10.1007/s11150-020-09495-x

Huebener, M., Waights, S., Spiess, C. K., Siegel, N. A., & Wagner, G. G. (2021). Parental well-being in times of covid-19 in germany. *Review of Economics of the Household*, *19*, 91-122. doi:10.1007/s11150-020-09529-4

Jace, C., & Makridis, C. (2020). Will you be mine? marriage as a protective factor during the pandemic. *SSRN Electronic Journal*. doi:10.2139/ssrn.3655856

Knudsen, A. K. S., Stene-Larsen, K., Gustavson, K., Hotopf, M., Kessler, R. C., Krokstad, S., . . . Reneflot, A. (2021). Prevalence of mental disorders, suicidal ideation and suicides in the general population before and during the covid-19 pandemic in norway: A population-based repeated cross-sectional analysis. *The Lancet Regional Health-Europe*, *4*, 100071.

Litwin, H., & Levinsky, M. (2021). Social networks and mental health change

in older adults after the covid-19 outbreak. *Aging and Mental Health*, *0*, 1-6. doi:10.1080/13607863.2021.1902468

McDowell, C. P., Dishman, R. K., Hallgren, M., MacDonncha, C., & Herring, M. P. (2018). Associations of physical activity and depression: Results from the irish longitudinal study on ageing. *Experimental Gerontology*, *112*, 68-75. doi:10.1016/j.exger.2018.09.004

Modig, K., Lambe, M., Ahlbom, A., & Ebeling, M. (2021). Excess mortality for men and women above age 70 according to level of care during the first wave of covid-19 pandemic in sweden: A population-based study. *The Lancet Regional Health-Europe*, *4*, 100072.

Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., John, A., . . . Abel, K. M. (2020). Mental health before and during the covid-19 pandemic: a longitudinal probability sample survey of the uk population. *The Lancet Psychiatry*, *7*, 883-892. doi:10.1016/S2215-0366(20)30308-4

Pirkis, J., John, A., Shin, S., DelPozo-Banos, M., Arya, V., Analuisa-Aguilar, P., . . . Baran, A. (2021). Suicide trends in the early months of the covid-19 pandemic: an interrupted time-series analysis of preliminary data from 21 countries. *The Lancet Psychiatry*, *8*, 579-588.

Reibling, N., Beckfield, J., Huijts, T., Schmidt-Catran, A., Thomson, K. H., & Wendt, C. (2017). Depressed during the depression: has the economic crisis affected mental health inequalities in Europe? findings from the European social survey (2014) special module on the determinants of health. *The European Journal of Public Health*, *27*(suppl_1), 47–54.

Sanchez, G. (2021). Covid-19 and suicides in the united states: An early empirical assessment. *Available at SSRN 3784365*.

Scherpenzeel, A., Axt, K., Bergmann, M., Douhou, S., Oepen, A., Sand, G., . . . Börsch-Supan, A. (2020). Collecting survey data among the 50+ population during the covid-19 pandemic: The survey of health, ageing and retirement in Europe (SHARE). *Survey Research Methods*, *14*, 217-221. doi:10.18148/srm/2020.v14i2.7738

Tubadji, A., Boy, F., & Webber, D. J. (2020). Narrative economics, public policy and mental health. *Covid Economics: Vetted and Real-Time Papers*.

Appendix

A   Mobility restrictions across countries

The Oxford Covid-19 Government Response Tracker (OxCGRT)[23] contains daily information about the duration of stay-at-home policies across countries. We exploit variable c6 provided by the organizers which captures mobility limitations, see Fig. A.1.

Graphs by country
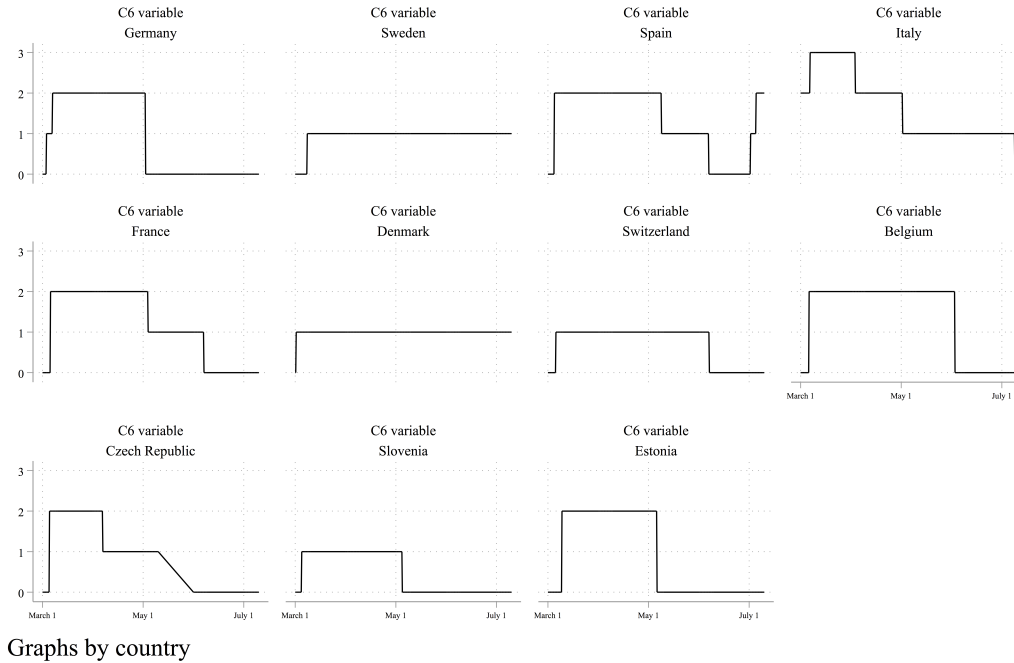
Fig. A.1. Stay-at-home policies across Europe in May-July 2020

Source: The Oxford Covid-19 Government Response Tracker (OxCGRT).
Note: From OxCGRT: C6 is equal to 0 - no measures, 1 - recommend not leaving home, 2 - require not leaving home with exceptions for daily exercise, grocery shopping, and 'essential' trips, 3 - require not leaving home with minimal exceptions (e.g., allowed to leave once a week, or only one person can leave at a time).

To get the duration of stay-at-home recommendations across countries, we count the number of days from February 1, 2020 during which containment measures recommended not leaving home (categories 1, 2 and 3). Fig. A.2 shows the duration of these measures since the beginning of the Corona outbreak across countries.

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[23]https://github.com/OxCGRT/covid-policy-tracker/blob/master/documentation/codebook.md
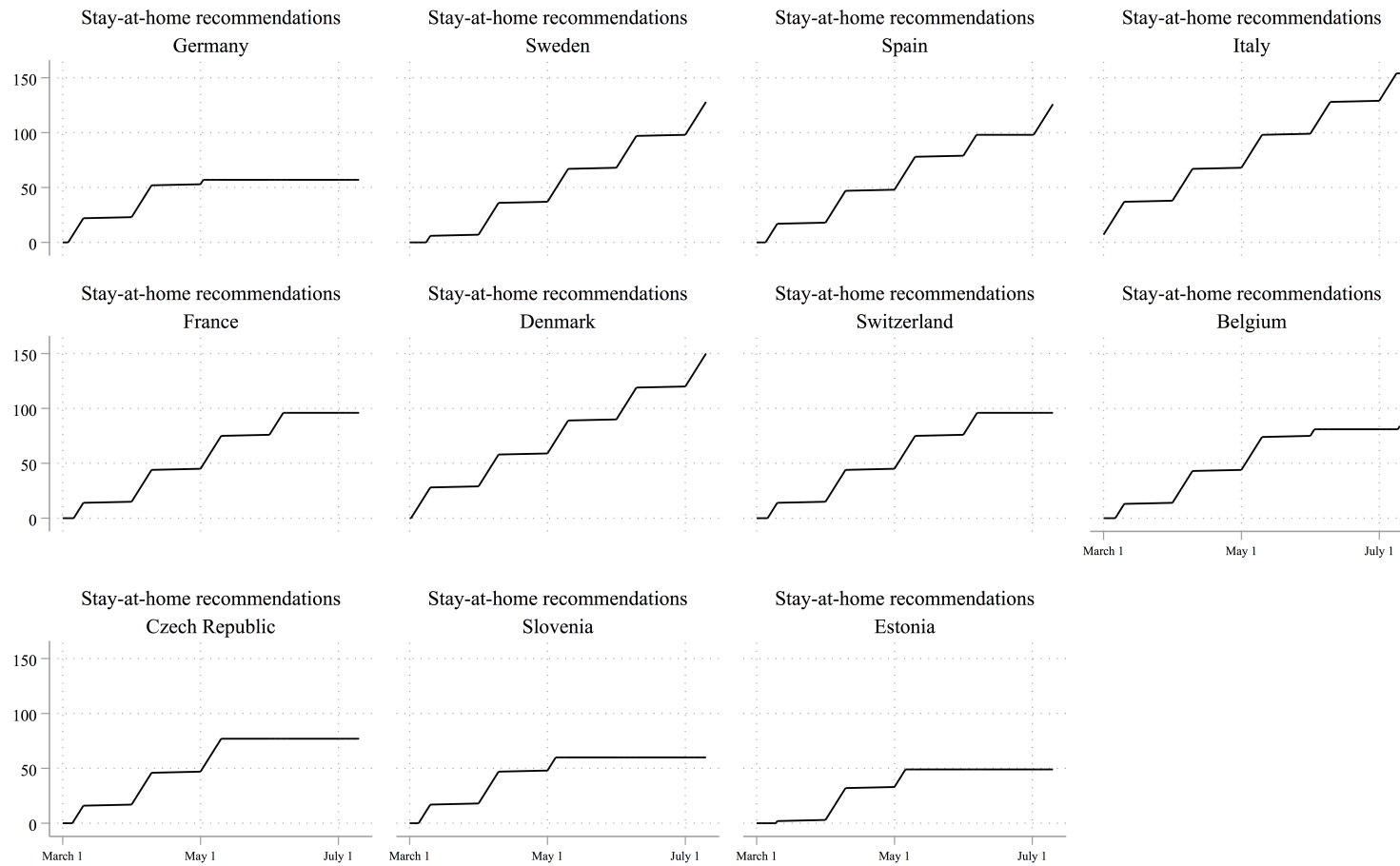
Fig. A.2. Cumulated number of days of stay-at-home recommendations across Europe

Source: The Oxford Covid-19 Government Response Tracker (OxCGRT).

Table A.1: Average marginal effect on mental well-being controlling for Covid-related indicators in June-July 2020

	Depressed		Felt lonely		Trouble sleeping	
	Not	More	Not	More	Not	More
	(1)	(2)	(3)	(4)	(5)	(6)
Reference categories: Single-with-others, rural area, single house, 5 or more rooms						
Alone	-0.0591***	0.0402***	-0.141***	0.0742***	-0.0295**	0.00937
	(0.0115)	(0.00938)	(0.0132)	(0.00888)	(0.0121)	(0.00725)
Couple	-0.0110	0.0302***	0.117***	-0.00959	-0.00692	0.00630
	(0.0110)	(0.00897)	(0.0124)	(0.00814)	(0.0116)	(0.00694)
Couple-with-others	-0.000961	0.0234**	0.151***	-0.0405***	0.0105	0.00137
	(0.0125)	(0.0104)	(0.0134)	(0.00869)	(0.0132)	(0.00781)
Big city	-0.0173***	0.0120**	-0.0110**	0.00780*	0.00516	0.00433
	(0.00549)	(0.00480)	(0.00548)	(0.00407)	(0.00571)	(0.00356)
Multiple units	-0.00572	0.00993**	0.0136**	-0.00870**	-0.0160***	0.000837
	(0.00555)	(0.00484)	(0.00557)	(0.00418)	(0.00579)	(0.00359)
≤ 2 rooms	0.0192**	-0.00538	0.00135	0.0000121	0.00821	-0.00240
	(0.00856)	(0.00746)	(0.00862)	(0.00634)	(0.00898)	(0.00542)
3 rooms	0.00190	0.00364	-0.00397	0.00285	0.00298	0.00913*
	(0.00727)	(0.00632)	(0.00724)	(0.00539)	(0.00753)	(0.00466)
4 rooms	-0.00301	0.0161***	0.00457	0.00551	0.00295	0.00875**
	(0.00702)	(0.00617)	(0.00694)	(0.00521)	(0.00728)	(0.00446)
Female	-0.117***	0.0919***	-0.0721***	0.0499***	-0.0938***	0.0312***
	(0.00516)	(0.00445)	(0.00527)	(0.00383)	(0.00542)	(0.00331)
65-79	0.0141**	-0.0175***	-0.00218	0.00122	0.0161**	-0.0218***
	(0.00646)	(0.00574)	(0.00645)	(0.00484)	(0.00674)	(0.00450)
80+	-0.00905	-0.00961	-0.0366***	0.0125**	-0.000228	-0.0333***
	(0.00844)	(0.00738)	(0.00837)	(0.00624)	(0.00874)	(0.00538)
High school	0.0137**	-0.00726	0.00987	0.00943**	0.00659	0.00814**
	(0.00633)	(0.00549)	(0.00634)	(0.00460)	(0.00664)	(0.00399)
University	-0.000357	0.00556	0.0135*	0.0153***	-0.00447	0.0210***
	(0.00748)	(0.00659)	(0.00740)	(0.00551)	(0.00783)	(0.00494)
With some difficulty	0.0792***	-0.0599***	0.0537***	-0.0339***	0.0660***	-0.0415***
	(0.0145)	(0.0130)	(0.0144)	(0.0113)	(0.0145)	(0.0102)
Fairly easily	0.134***	-0.0982***	0.123***	-0.0683***	0.0996***	-0.0674***
	(0.0141)	(0.0126)	(0.0139)	(0.0110)	(0.0141)	(0.00994)
Easily	0.147***	-0.111***	0.147***	-0.0812***	0.0960***	-0.0688***
	(0.0146)	(0.0130)	(0.0143)	(0.0113)	(0.0145)	(0.0103)
Having a child	-0.0185**	0.0237***	-0.00125	0.0107*	-0.00351	0.0107**
	(0.00876)	(0.00742)	(0.00864)	(0.00599)	(0.00935)	(0.00535)
Good	-0.0704***	0.0408***	-0.0687***	0.0199***	-0.0629***	0.0197***
	(0.00586)	(0.00505)	(0.00616)	(0.00448)	(0.00626)	(0.00354)
Fair	-0.183***	0.118***	-0.147***	0.0591***	-0.203***	0.0699***
	(0.00771)	(0.00677)	(0.00774)	(0.00583)	(0.00816)	(0.00513)
Poor	-0.370***	0.201***	-0.209***	0.0775***	-0.333***	0.126***
	(0.0134)	(0.0122)	(0.0129)	(0.00979)	(0.0136)	(0.0101)
July	0.0157***	-0.0194***	0.00408	-0.0153***	-0.00267	-0.00204
	(0.00522)	(0.00456)	(0.00522)	(0.00387)	(0.00545)	(0.00341)
Covid-related variables computed by country and the day of interview:						
Number of deaths	-0.00110***	0.00143***	-0.00190***	0.00100***	-0.00186***	0.00134***
	(0.000198)	(0.000169)	(0.000201)	(0.000142)	(0.000218)	(0.000130)
Number of infections	0.0000100	-0.00000402	0.000202***	0.0000265	0.000278***	-0.0000942***
	(0.0000333)	(0.0000285)	(0.0000345)	(0.0000240)	(0.0000373)	(0.0000226)
Stay-at-home	-0.000370***	0.000359***	-0.00100***	0.000740***	0.00115***	0.000377***
recommendations	(0.000115)	(0.000100)	(0.000112)	(0.0000836)	(0.000125)	(0.0000708)
Log likelihood	-17205.98		-17631.43		-18237.107	
N	26213		26179		26254	

Source: SHARE Wave 8 COVID-19 data. Reference categories are male, 50-64 years old, less than high school, with great difficulty ends meet, in very good health before the outbreak, Germany, June. Number of deaths (infections) is the number of deaths (infections) due to Covid-19 per 100.000. Two variables corresponds with the cumulative number of cases since February 1, 2020 before the day of interview across countries. Duration of stay-at-home recommendations also vary across countries and the day of the interview. The sample includes Belgium, the Czech Republic, Denmark, Estonia, Germany, France, Italy, Slovenia, Spain, Sweden, and Switzerland.

B Multinomial probit distance to the nearest child

Table B.1: Average marginal effect on mental well-being among parents in June-July 2020

	Depressed		Felt lonely		Trouble sleeping	
	Not	More	Not	More	Not	More
	(1)	(2)	(3)	(4)	(5)	(6)
Reference categories: child coresides, rural area, single house, 5 or more rooms						
< 1 km	-0.0354***	0.0384***	-0.0631***	0.0419***	-0.0214**	0.00719
	(0.00947)	(0.00822)	(0.00946)	(0.00704)	(0.00995)	(0.00617)
1-25 km	-0.0350***	0.0241***	-0.0567***	0.0405***	-0.0154*	0.0121**
	(0.00796)	(0.00699)	(0.00807)	(0.00605)	(0.00836)	(0.00515)
> 25 km	-0.0328***	0.0288***	-0.0721***	0.0535***	-0.0179*	0.00859
	(0.00952)	(0.00841)	(0.00955)	(0.00714)	(0.00997)	(0.00632)
Big city	-0.0184***	0.0120**	-0.0197***	0.00933*	0.00697	0.00151
	(0.00652)	(0.00571)	(0.00655)	(0.00481)	(0.00693)	(0.00428)
Multiple units	0.00511	0.000678	0.0171**	-0.00380	-0.0120*	0.000641
	(0.00666)	(0.00582)	(0.00666)	(0.00489)	(0.00704)	(0.00430)
≤ 2 rooms	-0.00397	0.00614	-0.00890	0.00582	0.00173	0.00242
	(0.0106)	(0.00939)	(0.0105)	(0.00777)	(0.0110)	(0.00703)
3 rooms	-0.0100	0.0116	-0.00965	0.00538	0.000303	0.0116**
	(0.00860)	(0.00756)	(0.00861)	(0.00642)	(0.00905)	(0.00558)
4 rooms	-0.00344	0.0156**	0.00840	0.00325	0.00300	0.00661
	(0.00810)	(0.00707)	(0.00816)	(0.00598)	(0.00854)	(0.00520)
Female	-0.126***	0.0929***	-0.0874***	0.0550***	-0.105***	0.0327***
	(0.00620)	(0.00555)	(0.00622)	(0.00475)	(0.00650)	(0.00412)
65-79	0.00363	-0.00947	-0.0213***	0.00821	0.0136*	-0.0207***
	(0.00752)	(0.00656)	(0.00771)	(0.00574)	(0.00788)	(0.00474)
80+	-0.0208**	-0.00325	-0.0759***	0.0260***	-0.00155	-0.0332***
	(0.00947)	(0.00824)	(0.00939)	(0.00689)	(0.00999)	(0.00619)
High school	0.0128*	-0.00645	0.0171**	-0.00373	0.0166**	0.00746
	(0.00760)	(0.00668)	(0.00751)	(0.00552)	(0.00802)	(0.00506)
University	-0.00829	0.00839	0.00953	0.00601	-0.000464	0.0268***
	(0.00905)	(0.00797)	(0.00901)	(0.00658)	(0.00952)	(0.00587)
With some difficulty	0.0697***	-0.0507***	0.0486***	-0.0241**	0.0616***	-0.0293***
	(0.0140)	(0.0117)	(0.0141)	(0.00962)	(0.0152)	(0.00816)
Fairly easily	0.134***	-0.0982***	0.114***	-0.0589***	0.0953***	-0.0614***
	(0.0136)	(0.0115)	(0.0137)	(0.00944)	(0.0148)	(0.00811)
Easily	0.150***	-0.105***	0.147***	-0.0777***	0.0950***	-0.0633***
	(0.0145)	(0.0122)	(0.0145)	(0.0102)	(0.0156)	(0.00879)
Good	-0.0734***	0.0375***	-0.0678***	0.0252***	-0.0708***	0.0168***
	(0.00836)	(0.00745)	(0.00822)	(0.00615)	(0.00870)	(0.00558)
Fair	-0.184***	0.110***	-0.146***	0.0645***	-0.198***	0.0698***
	(0.00932)	(0.00829)	(0.00938)	(0.00691)	(0.00970)	(0.00613)
Poor	-0.321***	0.183***	-0.190***	0.0824***	-0.291***	0.103***
	(0.0126)	(0.0111)	(0.0133)	(0.00950)	(0.0135)	(0.00814)
Sweden	0.0731***	-0.0162	-0.0135	0.0428***	0.0957***	0.00201
	(0.0180)	(0.0160)	(0.0178)	(0.0123)	(0.0197)	(0.0126)
Spain	-0.00405	0.0561***	0.0400**	-0.0299**	0.0808***	0.0524***
	(0.0159)	(0.0138)	(0.0167)	(0.0125)	(0.0176)	(0.0103)
Italy	-0.0173	0.0759***	-0.120***	0.0705***	0.0643***	0.0622***
	(0.0137)	(0.0119)	(0.0138)	(0.00999)	(0.0150)	(0.00905)
France	-0.000785	0.0309**	-0.0425***	0.00638	-0.00766	0.0469***
	(0.0144)	(0.0127)	(0.0146)	(0.0108)	(0.0155)	(0.00958)
Denmark	0.0996***	-0.0480***	0.103***	-0.0159	0.0758***	-0.0133
	(0.0166)	(0.0151)	(0.0176)	(0.0126)	(0.0174)	(0.0116)
Switzerland	0.0410**	0.0117	0.00257	0.0298**	0.0771***	0.0168
	(0.0164)	(0.0145)	(0.0169)	(0.0119)	(0.0180)	(0.0116)
Belgium	0.0202	0.0504***	-0.0391***	0.0538***	-0.0000882	0.0494***
	(0.0132)	(0.0114)	(0.0134)	(0.00959)	(0.0140)	(0.00869)
Czech Republic	0.0851***	-0.0733***	-0.0140	-0.0460***	0.000117	-0.00643
	(0.0142)	(0.0132)	(0.0141)	(0.0111)	(0.0147)	(0.00992)
Slovenia	0.133***	-0.0926***	0.0355**	-0.0414***	0.0262*	-0.0104
	(0.0142)	(0.0130)	(0.0143)	(0.0109)	(0.0147)	(0.00967)
Estonia	0.110***	-0.0500***	0.0779***	-0.0882***	-0.0124	-0.0409***
	(0.0128)	(0.0114)	(0.0133)	(0.0102)	(0.0135)	(0.00907)
July	0.0207***	-0.0215***	0.00921	-0.0164***	0.00746	-0.000658
	(0.00614)	(0.00540)	(0.00611)	(0.00452)	(0.00644)	(0.00398)
Living with a partner	0.0175**	0.00440	0.165***	-0.0513***	0.00314	0.00457
	(0.00693)	(0.00608)	(0.00640)	(0.00484)	(0.00730)	(0.00460)
Log likelihood	-12418.945		-12708.071		-13355.69	
Wald chi2(62)	2345.51		2763.91		2155.43	
N	19011		18993		19047	

Source: SHARE Wave 8 COVID-19 data. Reference categories are male, 50-64 years old, less than high school, with great difficulty ends meet, in very good health before the outbreak, Germany, June.

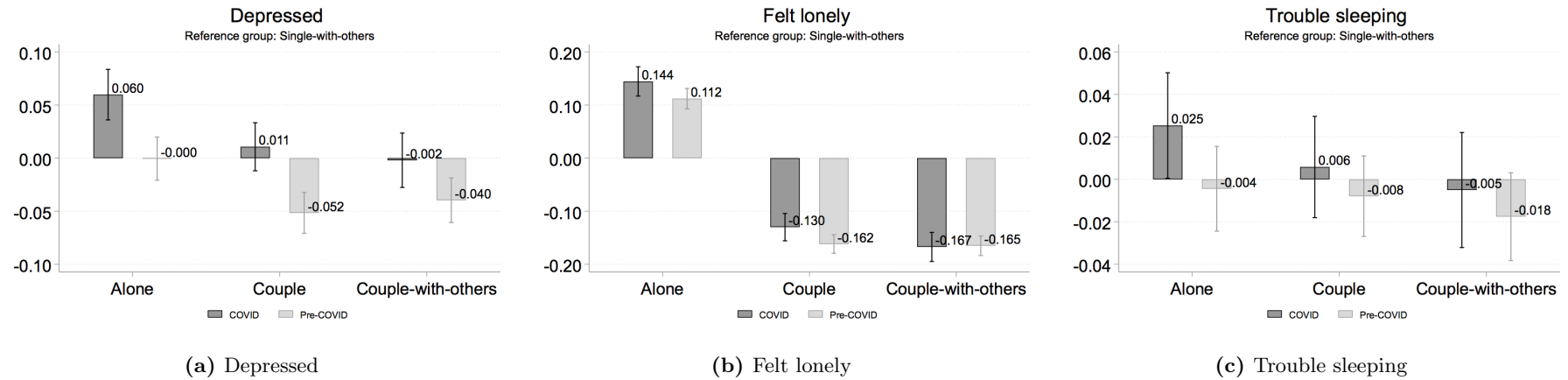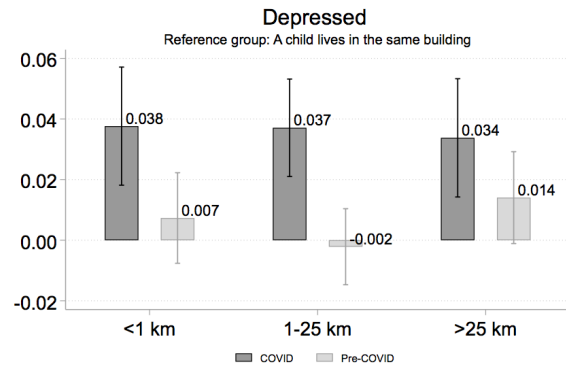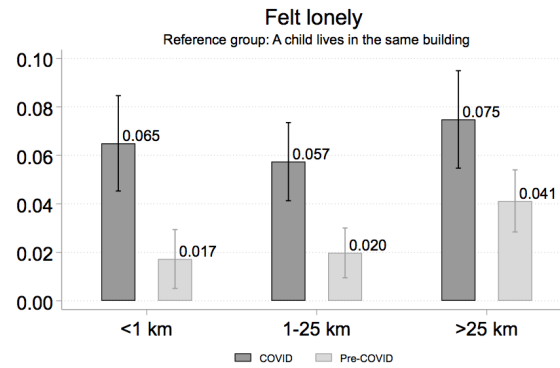# C Non-linear specification in the longitudinal analysis

Fig. C.1. Impact of household structure on mental well-being in June-July 2020

Note: Each column reports the average marginal impact of each category of household structure on being depressed (left figure), felt lonely (centered figure) and trouble sleeping (right figure). The reference group of household structure is Single-with-others. The results about COVID considers only wave 8 COVID (June-July 2020). The results about pre-COVID restricts to wave 5 and 6. We cluster standard errors at the individual level. All specifications control for three categories of age, education, female, previously reported health, number of children, ability to make ends meet, location, type of building, the month of interview, country fixed effects and country-wave interactions. The sample includes Belgium, the Czech Republic, Denmark, Estonia, Germany, France, Italy, Slovenia, Spain, Sweden, and Switzerland.

Fig. C.2. Impact of distance to the nearest child on parental mental well-being in June-July 2020
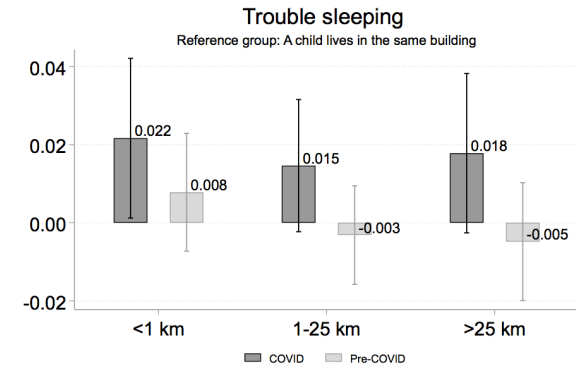
Note: Each column reports the average marginal impact of each category of household structure on being depressed (left figure), felt lonely (centered figure) and trouble sleeping (right figure). The reference group of distance to the nearest child is coreside. The results about COVID considers only wave 8 COVID (June-July 2020). The results about pre-COVID restricts to wave 5 and 6. We cluster standard errors at the individual level. All specifications control for three categories of age, education, female, living with a partner indicator, previously reported health, number of children, ability to make ends meet, location, type of building, the month of interview, country fixed effects and country-wave interactions. The sample includes Belgium, the Czech Republic, Denmark, Estonia, Germany, France, Italy, Slovenia, Spain, Sweden, and Switzerland.

D Longitudinal analysis: type of building and number of rooms

Table D.1: Impact of housing conditions on mental well-being in June-July 2020

	Depressed		Felt lonely		Trouble sleeping	
	Multiwave	FE	Multiwave	FE	Multiwave	FE
	(1)	(2)	(3)	(4)	(5)	(6)
Panel I: Type of building						
Multiple units	0.00132	0.0144**	-0.00408	-0.0146**	0.000890	0.00912
	(0.00422)	(0.00733)	(0.00355)	(0.00617)	(0.00424)	(0.00696)
Multiple units × COVID	0.000295	-0.00593	-0.00917	-0.00105	0.0107*	0.00262
	(0.00641)	(0.00808)	(0.00597)	(0.00709)	(0.00649)	(0.00784)
COVID	-0.118***	-0.162***	0.0693***	0.0686***	-0.0796***	-0.0793***
	(0.0181)	(0.0213)	(0.0143)	(0.0169)	(0.0178)	(0.0194)
Individual FE	No	Yes	No	Yes	No	Yes
Mean dep. var.	.358	.3544	.2456	.2445	.3373	.3353
R^2	0.111	0.0530	0.152	0.0347	0.0861	0.0197
N	91988	87165	91929	87113	92085	87236
Panel II: Number of rooms						
≤ 2 rooms	-0.0305***	-0.0592**	-0.00940	-0.0493**	-0.00204	0.0178
	(0.00717)	(0.0267)	(0.00637)	(0.0237)	(0.00727)	(0.0252)
3 rooms	-0.0138**	-0.0339	0.00486	-0.0287	-0.0179***	0.0240
	(0.00575)	(0.0215)	(0.00492)	(0.0184)	(0.00583)	(0.0195)
4 rooms	-0.00445	-0.0147	-0.00314	-0.0289*	-0.00831	0.00257
	(0.00537)	(0.0184)	(0.00437)	(0.0156)	(0.00538)	(0.0171)
≤ 2 rooms × COVID	0.0299***	0.0302**	0.00797	0.0262**	0.00644	0.00621
	(0.0102)	(0.0127)	(0.00962)	(0.0114)	(0.0103)	(0.0123)
3 rooms × COVID	0.0195**	0.0208**	-0.00664	-0.00137	0.0194**	0.0150
	(0.00840)	(0.0103)	(0.00780)	(0.00915)	(0.00847)	(0.0101)
4 rooms × COVID	0.0111	0.0109	-0.00121	0.0152*	0.00849	-0.000176
	(0.00814)	(0.00996)	(0.00738)	(0.00858)	(0.00812)	(0.00961)
COVID	-0.127***	-0.176***	0.0653***	0.0620***	-0.0823***	-0.0865***
	(0.0183)	(0.0215)	(0.0144)	(0.0171)	(0.0180)	(0.0195)
Individual FE	No	Yes	No	Yes	No	Yes
Mean dep. var.	.3575	.3538	.2455	.2444	.3372	.3352
R^2	0.112	0.0532	0.152	0.0350	0.0865	0.0197
N	91263	86492	91204	86441	91357	86561

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We cluster standard errors at the individual level. All specifications control for three categories of age, household structure, previously reported health, number of children, ability to make ends meet, the month of interview, country fixed effects and country-wave interactions. Columns 1, 3 and 5 control further for education, female, and country fixed effects. In *Panel I*, we add control for location. In *Panel II*, we control for both location and type of building. The sample includes Belgium, the Czech Republic, Denmark, Estonia, Germany, France, Italy, Slovenia, Spain, Sweden, and Switzerland.

E   Heterogeneity across gender

Table E.1: Heterogeneity across gender in the impact of area of living on mental well-being in June-July 2020

	Depressed		Felt lonely		Trouble sleeping	
	Multiwave (1)	FE (2)	Multiwave (3)	FE (4)	Multiwave (5)	FE (6)
Female	0.164***		0.0459***		0.149***	
	(0.00506)		(0.00423)		(0.00510)	
Big city	0.0253***	0.0129	0.00549	0.00932	0.0158***	0.0117
	(0.00608)	(0.0124)	(0.00492)	(0.0104)	(0.00602)	(0.0115)
Big city × COVID	-0.0146	-0.00203	0.00362	0.00504	-0.0171*	-0.0139
	(0.00899)	(0.0116)	(0.00831)	(0.01000)	(0.00926)	(0.0113)
Big city × Female	-0.0345***	-0.0406**	-0.0116*	-0.0245*	-0.0277***	-0.0405**
	(0.00814)	(0.0169)	(0.00685)	(0.0144)	(0.00816)	(0.0160)
COVID × Female	-0.0539***	-0.0648***	0.0236***	0.0235***	-0.0523***	-0.0604***
	(0.00765)	(0.00948)	(0.00708)	(0.00831)	(0.00777)	(0.00918)
Big city × COVID × Female	0.0511***	0.0431***	0.0180	0.0304**	0.0270**	0.0187
	(0.0125)	(0.0157)	(0.0116)	(0.0137)	(0.0126)	(0.0152)
COVID	-0.0933***	-0.138***	0.0476***	0.0481***	-0.0451**	-0.0441**
	(0.0183)	(0.0216)	(0.0145)	(0.0173)	(0.0180)	(0.0196)
Individual FE	No	Yes	No	Yes	No	Yes
R^2	0.112	0.0543	0.153	0.0358	0.0866	0.0212
N	91988	87165	91929	87113	92085	87236

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We cluster standard errors at the individual level. All specifications control for three categories of age, household structure, previously reported health, number of children, ability to make ends meet, the month of interview, type of building, country fixed effects and country-wave interactions. Columns 1, 3 and 5 control further for education, female, and country fixed effects. The sample includes Belgium, the Czech Republic, Denmark, Estonia, Germany, France, Italy, Slovenia, Spain, Sweden, and Switzerland.