

The Gender Gap in Mental Well-Being During the Covid-19 Outbreak: Evidence from the UK*

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Abstract

We document a decline in mental well-being after the onset of the Covid-19 pandemic in the UK. This decline is more than twice as large for women as for men. We seek to explain this gender gap by exploring gender differences in: family and caring responsibilities; financial and work situation; social engagement; health situation, and health behaviours, including exercise. We discuss two dimensions of gender differences, the extent to which particular circumstances relate to well-being and the share of individuals facing a given circumstance. Overall, we find that differences in family and caring responsibilities can explain a part of the gender gap, but the bulk is explained by social factors such as loneliness. Other factors such as financial difficulties or age are similarly distributed across genders and thus play little role in explaining the gap.

JEL Classification: I10, I14, I18, I30

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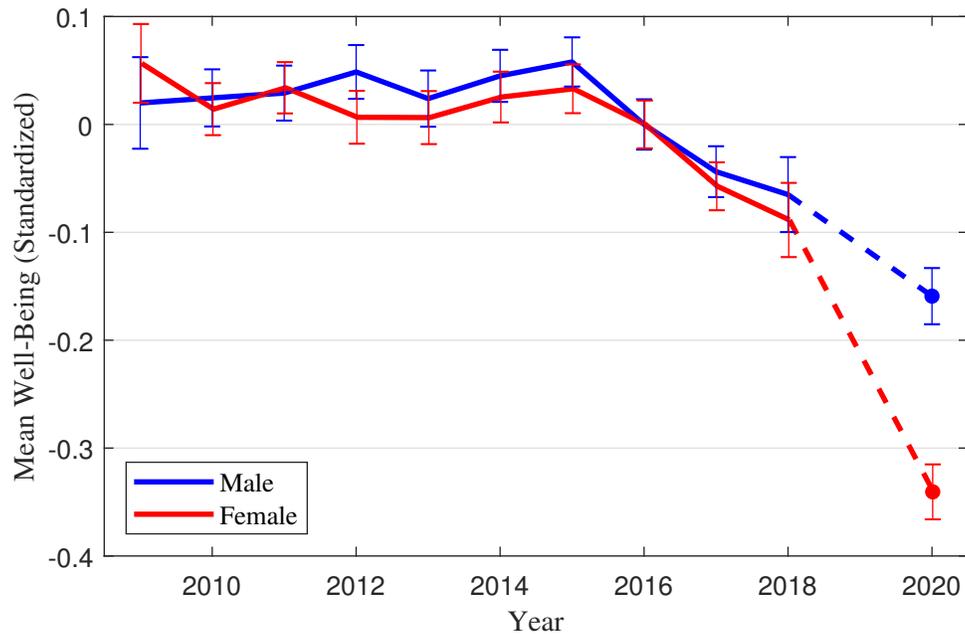
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1 Introduction

The Covid-19 pandemic has caused large disruption to much of the population across the globe, and along many dimensions. Early evidence suggests this disruption has negatively and substantially affected mental well-being (Adams-Prassl et al. 2020b; Banks and Xu 2020; Davillas and Jones 2020). This same early evidence suggests that the effects on well-being have been felt unequally, and have been noticeably born by women.¹

We document a large decline in mental well-being after the Covid outbreak in the UK. To illustrate, Figure 1 displays average well-being by gender over time, including after the pandemic’s onset. It shows a large drop after onset, and, consistently with the existing evidence, a disproportionate effect on women, for whom the impact appears to be over twice as large.² In this paper, we use

Figure 1: Mental Well-Being by Gender
Indexed to 2016 = 0



Notes: Data from UKHLS waves 1-9 and Covid module. Data for 2019 are collected mainly in wave 10, which is not yet publicly available. Figure shows standardized, seasonally-adjusted and inverted Likert score, obtained from 12 questions in the General Health Questionnaire. See section 2 for more details. Profiles indexed to 0 in 2016. Sample consists of all those responding to the Covid module, whether or not they responded to previous waves. Error bars are 95% confidence intervals.

rich representative data from the UK Household Longitudinal Survey to explore potential reasons

¹In addition to the papers mentioned above see further the dedicated literature review below.

²Given the low frequency of the data, we cannot causally attribute the decline to the pandemic alone. Banks and Xu (2020) focus on the issue of time trends and show that, after accounting for these, a large portion of the decline remains unexplained. Given largely similar profiles for men and women before 2020, controlling for trends has a negligible effect on the gender gap. We thus refrain from making additional assumptions that would be required for the analysis of trends and focus on the gender gap in the ‘raw’ data.

for this differential impact. We first relate changes in well-being at the individual level (measured by the General Health Questionnaire (GHQ)) with various changes in circumstance and discuss to which extent women and men face differential exposure to these circumstances. In particular, we document how well-being of women and men is related to a variety of factors that have been shown to be affected by Covid, such as the economic situation and time use within the household. Building on the literature in psychology (see e.g. Holt-Lunstad et al. 2015, for a recent review), we additionally consider social circumstances such as friendships and loneliness. We then examine to what extent differential exposure to these factors can help explain the widened gender gap. Accordingly we shed light on which of the particular dimensions of disruption might be affecting well-being to the largest degree.

As of today, the UK has been one of the countries most affected by the Covid pandemic. At its peak in mid-April, the 7-day moving average of official daily deaths was 950 (14 per million per day), among the highest rates in the world. Meanwhile, the data we examine were collected only a little afterwards, when the death rate was around 800 per day.³ At this time the ‘lockdown’ was in full force, including strict social distancing measures.⁴ Indicators of economic activity were sharply negative.⁵ At the same time, the main policy tools relating to the economy, such as the UK Job Retention (‘furloughing’) Scheme, were already well established.⁶

Regarding time use and economic factors that have been shown to be affected by the pandemic, we find we find that those with high childcare duties have shown noticeable deteriorations in well-being. A higher number of women report these duties and women are more affected by them than men. Similarly we find large declines in well-being reported by those in a tough financial situation, with similar numbers of women and men facing such circumstances. Consistently with the literature (L. Winkelmann and R. Winkelmann 1998), large declines in well-being are reported by those who have entirely lost their job. However, the size of this group is dwarfed by the number of workers who’ve seen a reduction in hours, yet remain in contact with their employer, such as through furloughing. For these workers, declines in well-being are small, which indicates the beneficial effects of the unusual labour market policies in place at the time.

In addition, we document a strong correlation between declines in well-being and social factors. The declines in well-being are particularly large for those who report often feeling lonely, and similarly, those who report an increase in loneliness since their last pre-Covid interview. These correlations are larger for women and women are more likely than men to report higher levels of loneliness. To investigate this further, we make use of the background data collected before 2020. We find

³The data were collected from April 24th. See Section 2. Death rates obtained from <https://www.worldometers.info/coronavirus/country/uk/>, accessed on June 4th 2020.

⁴See, for example, the cross-country tracker of policy responses in Hale et al. (2020).

⁵For example, over the weekend during which most of our data were collected the FTSE 100 stock market index stood at 5750 points, 25% below its level at the beginning of the year.

⁶The UK Job Retention Scheme was introduced on March 20, 2020. All the other main schemes were introduced at a similar time, including the Self-Employed Income Support and Mortgage Relief Schemes, among others.

that those who previously reported fewer friends are less affected by the pandemic, presumably because they are impacted less by the social distancing policies imposed. In terms of demographics, we document that those aged between 16 and 30, both men and women, have been much more negatively affected than older individuals.

Our main empirical exercise is to examine which of these factors help explain the gender gap in well-being on aggregate. Here we focus on *differential exposures* across women and men. For example, even though the young have been more affected than the old, the gender composition across age categories is balanced. Therefore, gender differences in well-being cannot be explained by age. Likewise, women and men have born adverse financial outcomes similarly, and so the gender gap is not explained by this factor. To explain the gap, we find some role for family time use and childcare. Women spend more time with their children than men. However, the large majority of adults do not have young children, and so the role of this factor overall is limited. In fact, most important appear to be social factors. This is likely explained by the two observations mentioned above. First, a larger number of women reports high levels of loneliness. Second, higher levels of loneliness are strongly related to declines in well-being. Thus, social factors appear to be important in explaining differential impacts by gender.

In terms of implications for policy, our results are suggestive of the strongly adverse and unequal effect of social distancing. Our results can therefore inform debates at a time when policy makers must weigh up many competing objectives. In particular, our results suggest that lockdown is impacting mental well-being of women less through its effect on the labour market or wider economy, and more through the direct loss of social interaction. Further evidence of an adverse effect of policies rather than, say, the virus itself, is the fact that younger individuals see larger well-being declines, despite the widespread reporting that the young are not as affected by the disease.

After a review of the literature the paper proceeds as follows. We describe the data in Section 2. In Section 3 we show the gender-specific distributions of well-being scores and present gender-specific correlations of variables that have been suggested or shown to affect mental well-being. We also discuss the distribution of gender within these variables. We then evaluate to what extent these variables can help explain the gender gap in mental well-being that has arisen in the UK during the pandemic. Section 4 concludes.

Related Literature

In general, it has been established that mental well-being is related to both economic and social factors. In particular, mental well-being can be negatively affected by bad economic outcomes. For example, using quarterly British data from 2002-2016, (Janke et al. 2020) estimate that a one percent increase in the employment rate leads to a 4.2% reduction in mental health conditions.

Evidence from previous economic downturns suggests that such events affect mental health of men and women differently (Chang et al. 2013; Dagher et al. 2015).

Regarding social factors, both objective isolation and its subjective perception (loneliness) can negatively impact mental health (Cacioppo et al. 2015, 2011; Holt-Lunstad et al. 2015; House et al. 1988).⁷ Focusing on subjective well-being specifically, loneliness has been shown to have a moderately strong association (VanderWeele et al. 2012). Even though closely related and similarly impacting well-being, loneliness needs to be conceptually distinguished from social support networks (Golden et al. 2009). We thus include both the number of close friends as a proxy for social support networks and loneliness in our analyses.

Shortly after the outbreak of Covid-19, international organizations and researchers started to warn about not only the immediate physical, but also the psychological effects of the pandemic (Holmes et al. 2020; World Health Organization 2020). Based on a review of existing evidence Brooks et al. (2020) conclude that quarantine is negatively related to a variety of psychological factors, including (post-traumatic) stress symptoms and anxiety. Indeed, Fetzer et al. (2020a) causally show that higher perceived mortality and contagiousness increases anxiety related to economic outcomes.

Early Covid-related studies have started to examine the channels through which well-being and mental health are being affected. Results from google trends analyses suggest that lockdowns can have severe mental health implications with search terms loneliness, worry and sadness increasing under lockdowns in different countries (Brodeur et al. 2020; Knipe et al. 2020; Tubadji et al. 2020). Other research suggests that a more nuanced view is necessary: Fetzer et al. (2020b) show that mental well-being temporarily *increases* with lockdowns and relate this to the fact that many individuals perceived the early government responses to be inefficient and are thus relieved when lockdowns are imposed. Evidence from Germany suggests that mental health (measured by calls to the largest helpline) worsened just after the lockdown and started easing with the third week of lockdown (Armbruster and Klotzbuecher 2020). The authors discuss that the decline in mental health is not driven by financial worries or fear of the disease, but is due to higher levels of loneliness and anxiety. Contrary to this, and using Swiss helpline data, (Brühlhart and Lalive 2020) find an increase only in calls directly related to the pandemic (i.e. elderly persons calling and calls related to fear of infection). Early results from a UK stakeholder survey at the very beginning of the pandemic (Cowan 2020) reveal that many concerns regarding mental health revolve around anxiety, isolation and access to support. Further worries concern the impact of the pandemic on family and relationships. The report hints at differential concerns: women report being more worried about isolation, social distancing and mental health.

Even early in the pandemic, it became clear that the crisis would have differential economic and health impacts on different socio-economic groups (e.g. Alon et al. 2020; Dingel and Neiman 2020). Adams-Prassl et al. (2020a) collect two independent waves of survey data in late March and early

⁷In general, women are more likely to be affected by anxiety (Remes et al. 2016).

April in the UK, US and Germany. They find that women in the UK and the US (though not in Germany) are 5 percentage points more likely to have lost their jobs than men and are 5 percentage points less likely to be able to work from home. Additionally, women spend significantly more time taking care of children and homeschooling, even if they are still employed and able to work from home. For those who still work, there is no gender difference in the likelihood of experiencing a fall in income. A closer look within the household is offered by Andrew et al. (2020) who conducted a survey of UK families around early May with time use data collected from both parents. They document that mothers and fathers in two opposite-gender households are differentially affected by the lockdown. These differences in economic outcomes and time use during the lockdown appear to be natural candidates to explain the gender gap in mental well-being. In terms of mental well-being, Adams-Prassl et al. (2020b) find in a cross-sectional survey in the US that women tend to be worse off during lockdown.

The main drawback of many of these early studies is that they rely on cross-sectional surveys with limited background characteristics of respondents. We use rich data from an established longitudinal survey (University of Essex 2019) that allows the analysis of 1) within-person changes, 2) background characteristics before the outbreak of the pandemic and 3) different individuals in the same household. As such, our work is most similar to Banks and Xu (2020), Daly et al. (2020), Davillas and Jones (2020), and Zhou et al. (2020), who use the same data to us.⁸ While all these studies document larger declines in mental well-being effects during the pandemic for women, they do not investigate in detail the contributory factors to these differential impacts.

More broadly, our work relates to an established literature that addresses gender gaps in well-being over time. For example, (Stevenson and Wolfers 2009) address the ‘paradox’ of declining women’s happiness in the U.S. against the background of increasing success of women across a range of economic and social spheres. In fact we similarly find a persistent gender gap in well-being scores across all waves of UKHLS. It should be noted, however, that in our analysis we difference out all individual heterogeneity in reporting and focus on the *extra* effect of the Covid outbreak. Overall, and in the context of this literature, our work is therefore informative about the role of differences in social needs and social engagement in the production of mental well-being across genders.

2 Data

We use the Covid-19 module from the UK Household Longitudinal Survey (UKHLS), administered monthly from April 2020. The current dataset uses the Covid module’s first wave and will be updated once new waves become available. The interviews used here were conducted in the 7 days from Friday April 24, with 75% of interviews completed by Sunday April 26. We merge these

⁸Benzeval et al. (2020) use the same data and document large heterogeneity in *economic* impacts.

data with waves 1-9 of the ‘parent’ UKHLS (also known as ‘Understanding Society’), a large-scale national survey administered yearly from 2009.

The UKHLS Covid April wave was conducted entirely over the internet. The underlying sampling frame consists of all those who participated in the UKHLS main survey’s last two waves. To conduct the fieldwork, the sample was initially contacted using a combination of email, telephone, postal and SMS requests. From the underlying sampling frame, the response rate was a little under 40%. To adjust our analysis for non-response, we use the survey weights provided. In addition, to allow for the fact that many respondents are related either through primary residence or through the extended family, we cluster all regressions at the primary sampling unit level. For a further discussion of the Covid module and underlying UKHLS design see Social and Research (2020), ISER (2020).

The main variable of interest is mental well-being. Our measure is derived from the Likert index that sums 12 questions from the General Health Questionnaire (GHQ-12). The GHQ battery asks questions regarding, for example, the ability to concentrate, loss of sleep and enjoyment of day-to-day activities. Importantly, the questionnaire asks participants to evaluate their well-being with respect to ‘usual’ and thus induces a reference point against which respondents evaluate their current feelings. This feature distinguishes our measure from other measures of mental well-being such as the WHO 5-question module (used e.g. in Adams-Prassl et al. 2020b) or the PHQ9 depression questionnaire (adopted e.g. in Fetzer et al. 2020b) that ask about occurrence of specific feelings or behaviors over the last two weeks. While the latter measures have been shown to reflect the cognitive dimension of well-being, our measure captures affective well-being (see e.g. Diener et al. 1985). The GHQ-12 from this survey has been widely used, both in psychological (e.g. Bridger and Daly 2019) and other social sciences research (e.g. Clark et al. 2019; Davillas et al. 2016; Davillas and Jones 2020; Powdthavee et al. 2019). Importantly the GHQ questionnaire has been administered in all waves of UKHLS in exactly the same form. For precise details on the GHQ questionnaire see Appendix B.

Each component of the GHQ can be scaled from 0 (least distressed) to 3 (most distressed). The Likert score is obtained by summing these scores to yield a total score between 0 and 36. We standardize this score across all waves and invert it so that, in our analysis, lower scores indicate lower well-being. To remove seasonal effects in mood, we take account for month effects, adjusting all pre-Covid data to ‘April equivalents’. To remove individual factors in reporting style, we typically use differences of the Covid-modules measures from wave 9. It should be noted that wave 9 data were collected mainly in 2017, but also, to a lesser extent, in 2018 and 2019. We treat all these data as uniformly ‘pre-Covid’ and, other than by the seasonal adjustment, do not adjust for differences in interview timing.

We make use of the extensive background information collected in the Covid April wave, as well as the prior UKHLS surveys. In the Covid module, participants were asked a battery of questions about their current experiences. These include questions on employment, on health, on caring

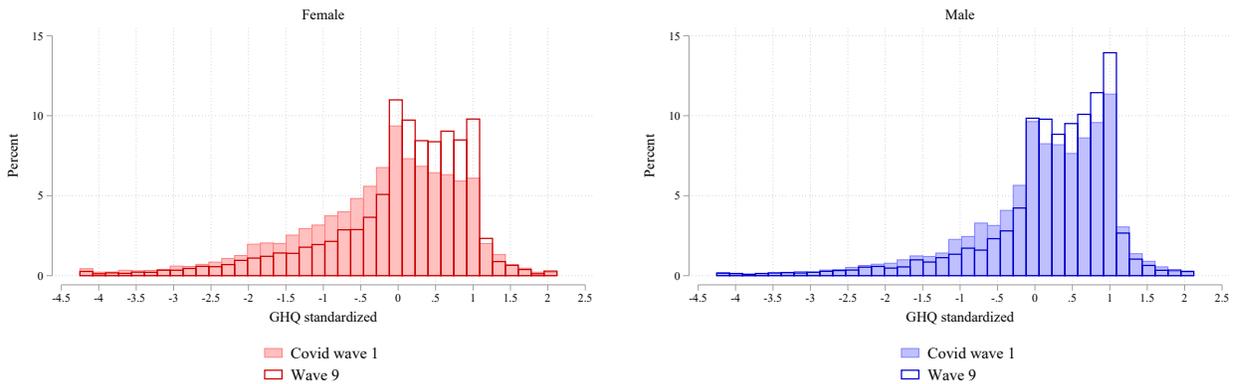
responsibilities, on time use and childcare, as well as self-assessments of financial situation and feelings of loneliness. From previous waves of UKHLS, we make particular use of a specific module conducted in wave 9 on social networks. This module contains detailed self-reports on the quantity, intensity and nature of friendships. Our measure of gender is self-reported sex, copied over from UKHLS wave 9. The adjusted number of interviews for which full information is available on all measures, including relevant measures from wave 9, is 12,250.

3 Results

3.1 Distribution of Well-Being by Gender

We focus on wave 9 (last wave before 2020) and the first wave during the pandemic, to take a closer look at the distribution of well-being by gender. Figure 2 shows the distribution of standardized well-being scores by gender.⁹ The left panel shows scores for women, where solid bars indicate values in 2020 and transparent bars show values in wave 9 (mostly in 2017). A solid bar being larger than a transparent one implies that a larger fraction of participants scored this value in 2020 than in wave 9. For both women and men, the left tail has become fatter, suggesting that a wide spectrum of individuals has been affected.

Figure 2: Distributions of Mental Well-Being Before and During the Pandemic, by Gender



Notes: Data from UKHLS wave 9 and Covid module. Figure shows standardized and inverted Likert score, obtained from 12 questions in the General Health Questionnaire.

Examining within-individual changes, we find that about 54 percent of respondents have worse mental well-being in 2020 than in wave 9. Sixty-one percent of those are women. Eleven percent of respondents do not see a change in their well-being and 34 percent have better well-being in 2020

⁹For the ease of exposition, this figure is not seasonally adjusted. In all of our regressions reported below, we control for seasonality.

than in wave 9. The composition of these latter two groups across genders is roughly balanced.¹⁰ In the following, we will explore the gap more rigorously and discuss how factors mentioned in the introduction, such as economic concerns, differences in time use and changes in social interactions contribute to these patterns.

3.2 Declines in Well-Being by Gender and by Salient Factors

We now present correlations of a variety of background characteristics/circumstances with the change in subjective well-being. Here, we make use of the panel structure of the data to calculate within-individual changes in subjective well-being by taking the first difference in measures (using wave 9 and the first Covid-19 wave). This holds constant any individual differences in reporting style. We present correlations separately for women and men and in light of potential differences in exposure to the circumstances that men and women face.

Time Use

We start with factors that relate to the situation within the household. Alon et al. (2020) discuss that the closure of schools and daycare facilities is likely to affect women more than men and that these effects are likely to be stronger than effects relating to employment. For the UK, Andrew et al. (2020) show that mothers in households with two opposite-gender parents bear a disproportionate share of household responsibilities. We therefore examine whether changes in well-being are related to caring duties, child care and time spent doing housework. Accordingly, Table 1 shows the change in well-being by gender and when individuals are grouped according to their current time use. Importantly, Table 1 includes all respondents, with and without children.

Columns 1 and 4 show that when splitting respondents by the time they are currently spending on child care, all of the different groups face on average worse well-being in 2020. Notably, there appears to be no significant difference in average well-being changes between those with currently moderate childcare duties (1 to 15 hours per week), and those with no childcare duties. Only those with substantial child care duties of over 15 hours appear to be significantly worse off, and women more so than men.

We show the proportions of the sample making up each category in Figure A.1, which we use extensively to discuss differential exposure. The figure indicates that the majority of those with substantial child care responsibilities are women.¹¹ However, it also shows clearly that the overwhelming majority of both women and men do not perform any childcare at all. This is due to the fact that most adults do not have young children. These proportions should be born in mind when

¹⁰Fifty-two percent of those without a change and 44 percent of those with better well-being are men.

¹¹14 percent of all women fall in this category, as do 8 percent of all men.

Table 1: Well-Being by Gender: Family, Time Use and Caring

	Female	Female	Female	Male	Male	Male
Child Care: 0 hrs	-0.23*** (0.02)			-0.11*** (0.02)		
1 to 15 hrs	-0.21*** (0.06)			-0.12** (0.05)		
> 15 hrs	-0.43*** (0.05)			-0.25*** (0.06)		
House Work: < 6 hrs		-0.12*** (0.04)			-0.11*** (0.03)	
6 to 10 hrs		-0.26*** (0.03)			-0.12*** (0.03)	
> 10 hrs		-0.31*** (0.02)			-0.13*** (0.03)	
Caring Duties: No			-0.24*** (0.03)			-0.12*** (0.02)
Yes			-0.28*** (0.02)			-0.13*** (0.02)
Observations	7235	7237	7237	5243	5242	5242
Adjusted R^2	0.056	0.056	0.053	0.021	0.019	0.019

Notes: Data from UKHLS wave 9 and Covid module. Table reports grouped means of outcome variable, which is the individual change in standardized, seasonally-adjusted and inverted GHQ Likert score. Standard errors clustered at the primary sampling unit and presented in parentheses. Covid survey weights used in all computations. Child care and house work hours from self-reported time use in the previous week. Caring duties variable is from self-report on responsibilities of caring for somebody outside the current residence in the previous 4 weeks.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

attempting to explain the gender gap in well-being in the aggregate. Even if well-being is negatively impacted by substantial childcare duties, and women perform a larger share of childcare duties, it seems unlikely that childcare alone can explain the gender gap overall.

Columns 2 and 5 examine the relationship between changes in well-being and time currently spent on housework. Again, all three groups face on average worse mental health in 2020 and this is true for both genders. However, the decrease in well-being seems to be declining further with more house work for women, but not for men. We also note imbalances in how many men and women fall into each of the three categories: 39 percent of men report doing housework for less than six hours, whereas only 20 percent of women are in the same situation (top center graph in Figure A.1). Over half of all surveyed women report substantial housework (more than ten hours per week); for men this number is 29 percent.

Columns 3 and 6 show the correlation of changes in well-being with caring responsibilities for others outside of the household. Both groups, those who care for others and those who don't,

face on average similar well-being declines in 2020. Again, we note a gender imbalance in caring responsibilities: 51 percent of women report caring for others while this number is 45 percent for men (top right graph in Figure A.1).

Economic Impacts

Much of the current literature on consequences of the pandemic has focused on economic impacts such as hours worked or facing financial difficulties. Table 2 shows the relationship of changes in well-being by gender and various indicators of economic position. Columns 1 and 4 show mean group correlation for a subjective measure asking how well respondents are getting by.¹² We use this measure as a summary of the complex impacts of loss of earnings and other incomes, as well as changes in expenditure patterns induced by the pandemic. We note a similar pattern as in Table 1, where all subgroups face a decline in well-being on average, irrespective of gender. Not surprisingly, we see a stronger average decline for those who report a worse subjective financial situation. The majority of respondents are ‘living comfortably’ or ‘doing alright’ (76 percent of women and 79 percent of men) and only a small fraction finds their situation ‘quite’ or ‘very’ difficult (six percent of each gender; see also middle left graph in Figure A.1).

Columns 2 and 4 show similar patterns for bill payments, a more objective measure of financial situation. Here, the average decline in well-being for those who are behind with all bills is not statistically significant for either women nor men, likely because the numbers affected are very small ($N = 18$ and 19 , respectively).

In Columns 3 and 6 we turn to furloughing and job loss, the latter of which is usually a strong predictor of subjective well-being (L. Winkelmann and R. Winkelmann 1998). Those who have lost their jobs fully have seen large declines in well-being, with women being affected worse than men. However, only less than one percent of the sample falls into this category, which implies that the explanatory power of job loss for the gender gap is likely to be limited. More usually, hours have been cut or employees have been furloughed. The decline in well-being is not significantly different for these individuals than for those who did not experience a reduction in working hours. Examining the fraction of women and men who lost their job or were furloughed, we do not see a difference between gender (15 percent for both genders; middle right graph in Figure A.1). Overall, we note that in terms of the financial and employment measures used here, women and men do not appear to be very differently affected. It is thus unlikely that financial measures can help explain a large share of the gender gap documented in Figure 1.¹³

¹²Respondents are asked ‘How well would you say you yourself are managing financially these days? Would you say you are...’, and then given 5 options: ‘Living comfortably’; ‘Doing alright’; ‘Just about getting by’; ‘Finding it quite difficult’, and ‘Finding it very difficult’.

¹³Note however, that particular subgroups of women, such as mothers in households with two opposite-gender parents or single mothers appear to be economically worse affected by the pandemic (Andrew et al. 2020; Benzeval et al. 2020).

Table 2: Well-Being by Gender: Finances and Work

	Female	Female	Female	Male	Male	Male
Finances: Comfortable	-0.17*** (0.02)			-0.04* (0.02)		
Doing alright	-0.25*** (0.03)			-0.12*** (0.02)		
Just about getting by	-0.38*** (0.05)			-0.18*** (0.05)		
Quite difficult	-0.36*** (0.12)			-0.36*** (0.12)		
Very difficult	-0.61*** (0.20)			-0.69*** (0.26)		
Bills: Up to date		-0.25*** (0.02)			-0.11*** (0.02)	
Behind with some		-0.40*** (0.09)			-0.35*** (0.12)	
Behind with all		-0.42 (0.71)			-0.20 (0.29)	
No hours reduction			-0.24*** (0.02)			-0.12*** (0.02)
Hours cut or furlough			-0.31*** (0.05)			-0.13** (0.05)
Job loss			-1.22*** (0.27)			-0.69*** (0.24)
Observations	7233	7209	7238	5239	5223	5243
Adjusted R^2	0.058	0.054	0.053	0.030	0.021	0.019

Notes: Data from UKHLS wave 9 and Covid module. Table reports grouped means of outcome variable, which is the individual change in standardized, seasonally-adjusted, and inverted GHQ Likert score. Standard errors clustered at the primary sampling unit and presented in parentheses. Covid survey weights used in all computations. Finances score is from self-report of present financial situation: variable ‘finnow’. Lateness of bill payments is from self-report: variable ‘xpbills’.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Social Factors

Perhaps the most immediate consequence of the pandemic has been social distancing induced by the lockdown policy. We therefore examine the role of social relationships and loneliness, which have been associated with subjective well-being in a predominantly psychological literature (for a review see e.g. Cacioppo et al. 2015). Table 3 shows social factors and their correlation with changes in well-being.

In contrast to the previous tables, in which we document a decline in well-being across all groups, different levels of social factors are differently related to changes in well-being. For respondents who

Table 3: Well-Being by Gender: Social Factors

	Female	Female	Female	Male	Male	Male
Lonely: Never	-0.02 (0.02)			0.01 (0.02)		
Sometimes	-0.41*** (0.03)			-0.35*** (0.04)		
Often	-1.01*** (0.08)			-0.82*** (0.12)		
Friends: 0		0.11 (0.11)			0.05 (0.08)	
1 to 3		-0.22*** (0.03)			-0.07** (0.03)	
4 to 6		-0.29*** (0.03)			-0.16*** (0.03)	
> 6		-0.31*** (0.03)			-0.16*** (0.03)	
Lonely: Less			0.26*** (0.04)			0.24*** (0.05)
Same			-0.19*** (0.02)			-0.07*** (0.02)
More			-0.89*** (0.04)			-0.77*** (0.06)
Observations	7237	7160	7234	5242	5161	5236
Adjusted R^2	0.120	0.052	0.150	0.074	0.018	0.107

Notes: Data from UKHLS wave 9 and Covid module. Table reports grouped means of outcome variable, which is the individual change in standardized, seasonally-adjusted and inverted GHQ Likert score. Standard errors clustered at the primary sampling unit and presented in parentheses. Covid survey weights used in all computations. Loneliness score is from self-report in Covid module: variable ‘sclonely’. Number of close friends is from the social networks module conducted in wave 9, with total count of close friends grouped into bins. Third and sixth columns use change in loneliness variable (sclonely) from wave 9.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

currently state they never feel lonely (71 percent of men and 55 percent of women), the loneliness variable is not correlated with well-being (see Columns 1 and 4).¹⁴ However, for those who report being lonely, the correlation between loneliness and well-being changes is strongly increasing in the level of reported loneliness. While this pattern holds for both genders, the fraction of affected women is higher: Thirty-four percent of women sometimes feel lonely and eleven percent often feel lonely, while these numbers are lower for men (23 and 6 percent, respectively; see also bottom left graph in Figure A.1).

¹⁴Note this is not explained by a lack of power as nearly two thirds of the sample fall into this category.

A useful feature of UKHLS is that we can examine background characteristics from before the onset of the pandemic. To examine the role of social connectedness in more detail, we make use of a special module conducted in wave 9 that elicits the number of close friends. *A priori*, it is not clear how the number of close friends would relate to subjective well-being during the pandemic and in particular the lockdown. On the one hand, one might hypothesise that a strong social network can help coping with such a difficult situation, thus leading to a positive correlation between number of friends and well-being changes. On the other hand, related to the above discussion of loneliness, being more connected might lead to increased feelings of loneliness during physical distance measures and lockdowns. Columns 2 and 4 suggest that the latter explanation applies: individuals with more close friends face larger declines in well-being. The pattern is similar for women and men, but the correlation between the number of close friends and changes in well-being appear to be stronger for women. Interestingly, the proportions of women and men who fall into the respective categories is largely similar: 64 percent of women report more than three close friends while only 2 percent report no friends at all; for men the respective proportions are 61 percent and 4 percent.

Finally, returning to loneliness, we check whether the declines in well-being are associated with some persistent loneliness trait or reported changes in this variable. The results are shown in Columns 3 and 6. Those who report less loneliness (in the Covid wave as compared to wave 9) show substantially *higher* well-being, while, consistently with columns 1 and 4, those who report an increase in loneliness are substantially less happy. While 21 percent of women report more loneliness, the respective fraction of men amounts to only 14 percent.

Other Factors

We investigate additional correlations of well-being changes with medical and health factors, health behaviors and key demographics. These are presented in Appendix tables A.1, A.2 and A.3, respectively. In sum, we find negative average changes in well-being for all groups and largely similar patterns for both genders.

Regarding medical factors, we see that those who experienced Covid symptoms (six percent of the sample) and those who are receiving help from outside the house (32 percent) experience larger declines in well-being. The only category that is not statistically significantly correlated with changes in well-being is being ‘vulnerable’, i.e. having received a letter to stay at home or being pregnant.¹⁵

Regarding health behaviors (shown in Table A.2), the most notable finding is that not being able to eat healthy meals is associated with significant declines in well-being, especially for women. In contrast, we do not see large differences in well-being changes for those who report to exercise as compared to those who do not. Likewise, those who consume alcohol appear to be similarly affected as those who abstain.

¹⁵Only four percent fall in this category and the coefficient is less precisely estimated.

We present correlations with key demographics in Table A.3. Interestingly, being in a couple seems only to have comparatively benefitted men. Those with children face slightly larger declines in well-being than those without. Most notable, however, are results by age (in line with Banks and Xu 2020; Davillas and Jones 2020). Youths of both genders face a substantially larger decline in well-being than older individuals. This is particularly interesting as overall, the young appear to be comparatively more affected by the policy response to Covid than by Covid itself.

3.3 Explaining the Gender Gap

We discussed in the previous subsection that women’s well-being might be more affected by the pandemic when facing a given circumstance. This would be reflected in stronger correlations of being in a given category and well-being changes for women (shown in Tables 1, 2 and 3). This is the case for variables such as hours spent on child care (all three correlations are stronger for women than for men), job loss (the correlation is nearly twice as large for women) or having more than three friends. Additionally, we discussed that, while women might be similarly affected as men by a given circumstance (reflected in similar correlations as for e.g. spending less than six hours on house work), they might have a different likelihood of facing the circumstance (as shown in Figure A.1; in the example of house work, the fraction of women falling into the less than six hours category is 20 percent, while the fraction is nearly twice as large for men (39 percent)). We now explore the extent to which these differential exposures help explain the gender gap in well-being shown in Figures 1 and 2.

Table 4 shows the results of a linear regression to which we add different sets of controls to explore potential drivers of the gender gap. Column 1 presents the raw gap in subjective well-being changes, where we regress the dependent variable on a gender dummy only. The negative coefficient shows that women experienced a 0.14 standard deviations larger decline in mental well-being during the pandemic than men. This is comparable to Adams-Prassl et al. (2020b) who calculate the gender gap in mental health in US states with and without the lockdown but without access to a panel dimension.¹⁶

Columns 2, 3 and 4 include as controls the variables discussed in Tables 1, 2 and 3, respectively. Column 2 controls for factors related to time use within the household, as well as caring responsibilities. These factors narrow the initial estimate of the gender gap by 0.04 standard deviations, or roughly 25 percent. This finding is in contrast to Adams-Prassl et al. (2020b) who conclude that caring responsibilities do not play a large role.¹⁷ Controlling only for financial and work-related factors in Column 3 does not reduce the gap significantly. This is in line with our discussion above

¹⁶More precisely, Adams-Prassl et al. (2020b) do not present an estimate of the gender gap without additional control variables. The gender gap in well-being in states without a lockdown is estimated to be 0.21 standard deviations, whereas the gender gap is 0.14 standard deviations larger in states with a lockdown.

¹⁷They measure caring responsibilities coarsely by a binary indicator ‘Have to change your work patterns to care for others’ and find that this variable is not correlated with well-being for either gender.

Table 4: Gender Gap in Mental Well-Being

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female	-0.144*** (0.023)	-0.108*** (0.025)	-0.140*** (0.023)	-0.048** (0.023)	-0.131*** (0.023)	-0.035 (0.024)	-0.148*** (0.021)
Controls:							
Family & Caring		X				X	
Financial & Work			X			X	
Social				X		X	
Medical					X	X	
Health Behaviour					X	X	
Demographic					X	X	
HH Fixed Effects							X
Observations	12252	12250	12252	12252	12252	12250	8758
Adjusted R^2	0.005	0.010	0.013	0.079	0.019	0.094	0.420

Notes: Data from UKHLS wave 9 and Covid module. Dependent variable is individual change in standardized, seasonally-adjusted and inverted GHQ Likert score. Sample in columns (1) to (6) is all individuals aged 16 and over with full interviews. Sample in column (7) comprises individuals in households with multiple interviews only. Covid survey weights used in all regressions. Standard errors clustered at the primary sampling unit and presented in parentheses. Column (1) includes a gender dummy and a constant, but no other controls. Family controls are hours of housework, hours of childcare, and a dummy for caring responsibilities. Financial controls are categorical variables for: self-reported financial situation; whether having trouble paying bills; having experienced job loss, or having been furloughed. Social controls are categorical variables for the number of close friends declared in wave 9, and self-reported loneliness. Medical controls are categorical variables for: having Covid symptoms either in the past or present; receiving external care from outside the house; being shielded or pregnant. Health behaviour controls are indicators for: drinking alcohol regularly; exercising vigorously or moderately at least 3 times a week; being able to eat nutritious meals. Demographic controls are age categories, indicators for the presence of children; being in a couple.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

that the fraction of women and men experiencing financial problems is very similar. This is also consistent with Adams-Prassl et al. (2020b) who discuss that the gender gap is not explained by realized economic impacts. Next, we explore the role of social factors. Loneliness and the number of close friends close the gap by about 67 percent, leaving only 0.05 standard deviations of the initial gap unexplained.¹⁸ This finding accords with the discussion above, in which we documented that more women are experiencing loneliness more often, and that the correlation between loneliness and changes in well-being is large.

Lastly, we include medical factors, health behaviors and demographic characteristics in combination. As documented above, some of these factors, notably age, are strongly related to declines in well-being. However, these factors are unlikely to explain the gender gap because they are similarly distributed across men and women. In total we find these factors explain about 10 percent (Column 5). When including all controls in Column 6, we can explain the gender gap to the extent

¹⁸In this specification, we can only reject the non-existence of the gender gap at the 5 percent level, instead of the 1 percent level in the previous specifications. Note that this is not driven by an increase in imprecision, but a reduction of the coefficient.

that the coefficient on the female dummy becomes statistically indistinguishable from zero. Overall, including all controls reduces the gender gap by around 76 percent.

In the final column we exploit a useful feature of the data, whereby all individuals in a residence are interviewed. Here we regress the dependent variable on the gender dummy and a set of household fixed effects. We do this only for households with more than one full interview.¹⁹ Column 7 shows that the household fixed effect has a large explanatory power for well-being, indicated by the high R^2 . However, the fixed effects do not affect the gender coefficient. This finding indicates that the gender gap is not explained by household effects: women are not overly represented in households that are doing worse during the pandemic.

Table 4 uses a fairly rich set of controls and shows that these can explain most of the gender gap. As a robustness check, we consider what happens to the gender gap when the set of controls is extended further, and includes relevant interactions. In Appendix table A.4, we allow for polynomials in childcare and hours of housework, both interacted with the presence of children. Additionally, we include indicators for being a keyworker, working from home in February 2020 (before the onset of the pandemic) and receiving formal care from outside the home. We also add indicators for the number of over-70s in the household, an indicator for holding a degree and interactions of these and basic demographic variables (the presence of children and being in a couple) with age. The estimates presented in Table A.4 do not differ from our main results in Table 4.

4 Conclusion

Early studies produced since the onset of the Covid-19 pandemic have found deteriorating mental well-being, particularly apparent for women. Using rich data we document a similar finding for the UK. We add to these existing studies by showing that much of the gender gap in well-being can be explained by gender differences in social factors and feeling lonely more often. We also show that gender differences in family-related time use and caring responsibilities appear to play a role.

The implications for policy are noteworthy. Our results are suggestive of the strongly adverse and unequal effect of social distancing. Our results can therefore inform debates at a time when policy makers must weigh up many competing objectives. In particular, our results suggest that lockdown is impacting mental well-being less through its effect on the labour market or wider economy, and more through the direct loss of social interaction.

¹⁹This reduces the same to 8758 observations. Running the baseline regression of Column 1 again, we find a similar gender dummy for this reduced sample.

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Appendix

A Additional Tables and Figures

Table A.1: Well-Being by Gender: Medical/Health Factors

	Female	Female	Female	Male	Male	Male
Symptoms: No	-0.24***			-0.11***		
	(0.02)			(0.02)		
Yes	-0.36***			-0.22***		
	(0.05)			(0.05)		
Vulnerable: No		-0.27***			-0.12***	
		(0.02)			(0.02)	
Yes		-0.12			-0.12	
		(0.09)			(0.08)	
Receiving help: No			-0.23***			-0.08***
			(0.02)			(0.02)
Yes			-0.30***			-0.21***
			(0.03)			(0.03)
Observations	7238	7238	7238	5243	5243	5242
Adjusted R^2	0.049	0.049	0.049	0.017	0.016	0.020

Notes: Data from UKHLS wave 9 and CoViD module. Table reports grouped means of outcome variable, which is the individual change in standardized, seasonally adjusted and inverted GHQ Likert score. Standard errors clustered at the primary sampling unit and presented in parentheses. CoViD survey weights used in all computations. ‘Symptoms’ comes from self-reported presence of symptoms since the onset of the pandemic. ‘Vulnerable’ takes value “yes” either if the individual has received an NHS letter requesting they should stay at home (‘shielded’) or the individual is pregnant. ‘Help’ is a self-report of whether the individual has received care from outside the house, either from family or not.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.2: Well-Being by Gender: Health Behaviours

	Female	Female	Female	Male	Male	Male
Alcohol: No	-0.22*** (0.03)			-0.13*** (0.04)		
Yes	-0.28*** (0.02)			-0.12*** (0.02)		
Exercise: No		-0.23*** (0.03)			-0.16*** (0.03)	
Yes		-0.28*** (0.02)			-0.09*** (0.02)	
Healthy Meals: No			-0.24*** (0.02)			-0.12*** (0.02)
Yes			-0.68*** (0.16)			-0.32* (0.18)
Observations	7238	7238	7236	5243	5243	5238
Adjusted R^2	0.049	0.049	0.053	0.016	0.017	0.017

Notes: Data from UKHLS wave 9 and Covid module. Table reports grouped means of outcome variable, which is the individual change in standardized, seasonally-adjusted and inverted GHQ Likert score. Standard errors clustered at the primary sampling unit and presented in parentheses. Covid survey weights used in all computations. Alcohol variable uses self-report of whether respondent has drunk any alcohol in previous 4 weeks. Exercise variable is based self-report of whether the individual has either done moderate exercise or vigorous exercise on three days in the previous week. Healthy meals variable is based on self-report of whether the individual was able to eat health food in the previous week: variable 'lacknutr'.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.3: Well-Being by Gender: Demographic Factors

	Female	Female	Female	Male	Male	Male
Age: 16 to 29	-0.46*** (0.06)			-0.31*** (0.06)		
30 to 49	-0.29*** (0.03)			-0.11*** (0.03)		
50 to 69	-0.17*** (0.02)			-0.06*** (0.02)		
Over 70	-0.20*** (0.03)			-0.12*** (0.03)		
Couple: Yes		-0.25*** (0.02)			-0.10*** (0.02)	
No		-0.27*** (0.03)			-0.18*** (0.04)	
Children: No			-0.23*** (0.02)			-0.10*** (0.02)
Yes			-0.32*** (0.04)			-0.18*** (0.04)
Observations	7238	7238	7238	5243	5243	5243
Adjusted R^2	0.055	0.048	0.049	0.023	0.018	0.017

Notes: Data from UKHLS wave 9 and Covid module. Table reports grouped means of outcome variable, which is the individual change in standardized, seasonally-adjusted and inverted GHQ Likert score. Standard errors clustered at the primary sampling unit and presented in parentheses. Covid survey weights used in all computations.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

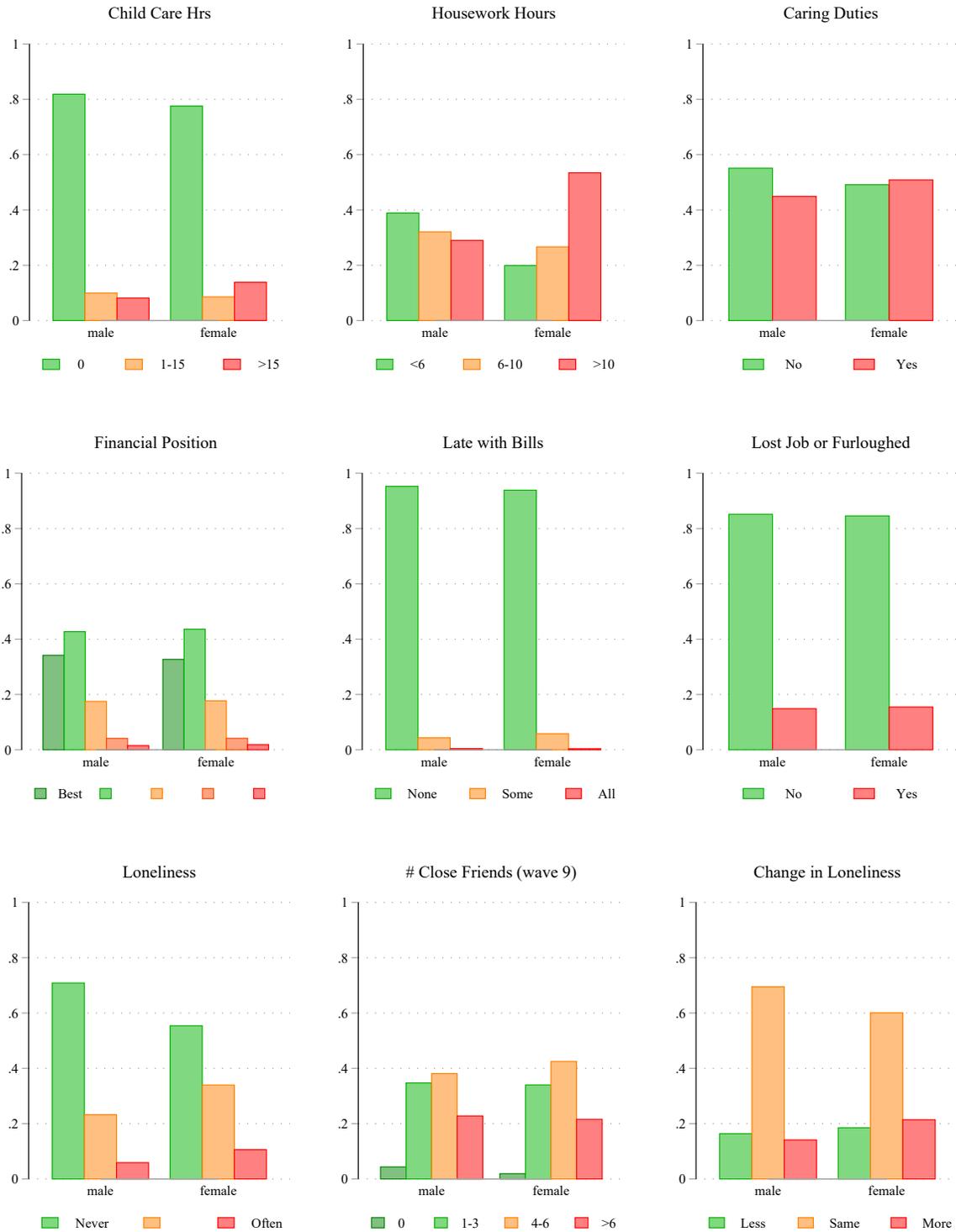
Table A.4: Gender Gap in Mental Well-Being: Richer Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female	-0.144*** (0.023)	-0.112*** (0.025)	-0.142*** (0.023)	-0.048** (0.023)	-0.133*** (0.024)	-0.039 (0.025)	-0.148*** (0.021)
Controls:							
Family & Caring		X				X	
Financial & Work			X			X	
Social				X		X	
Medical					X	X	
Health Behaviour					X	X	
Demographic					X	X	
HH Fixed Effects							X
Observations	12252	12250	12252	12252	12246	12244	8758
Adjusted R^2	0.005	0.011	0.014	0.079	0.028	0.105	0.420

Notes: Similar to Table 4, with some modifications to controls. Full list of controls as follows. Family controls are an interaction of the presence of children with: a cubic polynomial in hours of housework; cubic polynomial in hours of childcare; a dummy for caring responsibilities. Financial controls are categorical variables for: self-reported financial situation; whether having trouble paying bills; having experienced job loss, or having been furloughed; whether worked from home in February 2020. Social controls are categorical variables for the number of close friends declared in wave 9, and self-reported loneliness. Medical controls are categorical variables for: having Covid symptoms either in the past or present; receiving external care from outside the house; being shielded or pregnant; use of a formal carer; being a keyworker. Health behaviour controls are indicators for: being a smoker; drinking alcohol regularly; exercising vigorously or moderately at least 3 times a week; being able to eat nutritious meals. Demographic controls are age categories interacted with: presence of children; being in a couple; having elderly people in the home; having a degree.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure A.1: Proportions by Type and Gender



Notes: Data from UKHLS wave 9 and Covid module, including survey weights. Variables are the same as those presented in tables 1, 2 and 3. For each variable, figure reports proportions of the sample taking each value, by gender.

B Description of GHQ-12 Questionnaire

As discussed in section 2 our measure of mental well-being comes from the Likert scale derived from the 12-question GHQ questionnaire. The GHQ questions are listed below. The Likert scale is obtained by recoding so that the scale for individual variables runs from 0 to 3 instead of 1 to 4, and then summing, giving a scale running from 0 (the least distressed) to 36 (the most distressed). The questionnaire is administered to everyone.

In our analysis we standardize this variable across gender and wave to have a mean of zero and a standard deviation of one. We then multiply by -1 to obtain a scale that runs from negative (more distressed) to positive (less distressed).

Wording of the questions:

ghqa [GHQ: concentration]: The next questions are about how you have been feeling over the last few weeks. Have you recently been able to concentrate on whatever you're doing?

1. Better than usual 2. Same as usual 3. Less than usual 4. Much less than usual

ghqb [GHQ: loss of sleep]: Have you recently lost much sleep over worry?

1. Not at all 2. No more than usual 3. Rather more than usual 4. Much more than usual

ghqc [GHQ: playing a useful role]: Have you recently felt that you were playing a useful part in things?

1. More so than usual 2. Same as usual 3. Less so than usual 4. Much less than usual

ghqd [GHQ: capable of making decisions]: Have you recently felt capable of making decisions about things?

1. More so than usual 2. Same as usual 3. Less so than usual 4. Much less capable

ghqe [GHQ: constantly under strain]: Have you recently felt constantly under strain?

1. Not at all 2. No more than usual 3. Rather more than usual 4. Much more than usual

ghqf [GHQ: problem overcoming difficulties]: Have you recently felt you couldn't overcome your difficulties?

1. Not at all 2. No more than usual 3. Rather more than usual 4. Much more than usual

ghqg [GHQ: enjoy day-to-day activities]: Have you recently been able to enjoy your normal day-to-day activities?

1. More so than usual 2. Same as usual 3. Less so than usual 4. Much less than usual

ghqh [GHQ: ability to face problems]: Have you recently been able to face up to problems?

1. More so than usual 2. Same as usual 3. Less able than usual 4. Much less able

ghqi [GHQ: unhappy or depressed]: Have you recently been feeling unhappy or depressed?

1. Not at all 2. No more than usual 3. Rather more than usual 4. Much more than usual

ghqj [GHQ: losing confidence]: Have you recently been losing confidence in yourself?

1. Not at all 2. No more than usual 3. Rather more than usual 4. Much more than usual

ghqk [GHQ: believe worthless]: Have you recently been thinking of yourself as a worthless person?

1. Not at all 2. No more than usual 3. Rather more than usual 4. Much more than usual

ghql [GHQ: general happiness]: Have you recently been feeling reasonably happy, all things considered?

1. More so than usual 2. About the same as usual 3. Less so than usual 4. Much less than usual