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**INDIVIDUAL SUBJECTIVE WELL-BEING
DURING THE COVID-19 PANDEMIC**

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Abstract

This paper examines how contextual and institutional factors are associated with individual subjective well-being, which is measured by individuals' happiness, during the early stage of the COVID-19 pandemic. Using data collected in the People's Republic of China (PRC), the Republic of Korea, Japan, Italy, the United Kingdom (UK), and the four biggest states of the United States (US) in April 2020, we find that the financial effects (represented by employment and income change) and nonfinancial effects (represented by experiencing negative nonfinancial effects including mental health issues and enjoying positive benefits) caused by nonpharmaceutical measures to contain the spread of COVID-19 are associated with individual subjective well-being. Moreover, positive benefits could reduce the likelihood of becoming unhappy for those who have experienced negative nonfinancial effects or those who have lost their jobs. The results also suggest that the degree to which people agree with their government's approach to dealing with the COVID-19 pandemic is positively correlated with their happiness. The risks associated with the pandemic, however, are only slightly associated with people's happiness. We also find that the correlation between the above factors and individual well-being varies from country to country.

Keywords: subjective well-being, happiness, financial effects, mental health effect, COVID-19

JEL Classification: D0, D60, D62, I12

Contents

1. INTRODUCTION

Since the first case was identified in Wuhan, People's Republic of China (PRC), in early January 2020, COVID-19 has quickly spread to more than 200 countries and territories. By early January 2021, according to the statistics collected by the Johns Hopkins University Center for Systems Science and Engineering (JHU CSSE), more than 85 million people had been infected, of whom more than 1.8 million died (Wikipedia 2020). Although the mortality rate is comparatively low, the COVID-19 infection rate is high, with the virus spreading faster than other deadly viruses. Due to the speed and severity of infection, the COVID-19 pandemic has emerged as one of the greatest public health crises in recent decades. To deal with this pandemic, governments around the world have enacted a series of policies to slow the spread and prevent transmission, such as closing borders, imposing travel bans, and implementing lockdowns and quarantine. According to WEForum (2020), by the end of April 2020, there were about 2.6 billion people, or one-third of the total global population, living under some type of lockdown or quarantine. Such policies have profoundly affected the lives of billions of people around the world in financial and nonfinancial ways.

Many studies have examined the effects of this pandemic on economic growth (McKibbin and Fernando 2020), on the livelihoods of various groups of people (Glover et al. 2020), inequality (Alon et al. 2020), firm activities (Inoue and Todo 2020), labor markets (Gottlieb, Grobovšek, and Poschke 2020; Fadinger and Schymik 2020), and international trade (Baldwin and Evenett 2020). A growing number of studies examine the impact of COVID-19 on mental health (Pedraza, Guzi, and Tijdens 2020; Le and Nguyen 2020; Brodeur et al. 2020). These studies show that the COVID-19 pandemic has not only physical but also psychological effects on individuals' welfare. Thus, mental health as well as other aspects of well-being considerations should be important elements of decisions regarding the approach and intensity of nonpharmaceutical interventions a government should purse.

In addition to negative mental health effects, nonpharmaceutical measures also bring about several positive benefits, such as having more family time and interactions, and having time to enjoy personal interests, which are increasingly difficult to find under "normal" conditions. Moreover, literature also identifies some environmental benefits, such as a reduction in air pollution, improvement of air and water quality, lower noise levels, and reduced land surface temperature (Dang and Trinh 2020; Praveena and Aris 2021). Such positive benefits of lockdown may also influence individuals' well-being. Most of the current studies, however, focus on the effects of lockdown measures on several aspects of mental health, such as anxiety, boredom, and loneliness, and completely ignore how such mental health issues and positive benefits brought about by the lockdown measures may affect individuals' well-being.

Against this background, this study aims to fill the gap by examining how positive and negative nonfinancial effects of nonpharmaceutical measures to contain the spread of COVID-19, and COVID-19-induced financial effects jointly affect individual subjective well-being, which is measured by their happiness. We use the data collected during the third week of April 2020 in six countries: the PRC, the Republic of Korea, Japan, Italy, the UK, and the four biggest states in the US. We find that both the financial and nonfinancial effects of the pandemic are associated with individuals' happiness (and unhappiness.) Moreover, positive nonfinancial benefits could help to reduce the likelihood of being unhappy and their level of unhappiness for those who have experienced negative nonfinancial effects and those who have lost job because of nonpharmaceutical measures to contain the spread of COVID-19. Our empirical results

also suggest that the extent to which people agree with their government's approach to dealing with the pandemic is positively correlated with their happiness. Their perceptions of the effectiveness of containment measures are also positively associated with their well-being. The perceived risks of the pandemic, however, are not strongly associated with people's happiness.

This paper contributes to the literature in several aspects. First, our study examines not only the effects of negative nonfinancial consequences [1] of nonpharmaceutical measures but also the effects of positive benefits[2] of such measures on individuals' subjective well-being. In addition, we also examine the soothing role of experiencing such positive nonfinancial benefits in the relationship between happiness (and level of happiness) and experiencing negative nonfinancial consequences, and between happiness (and level of happiness) and having lost a job. Second, we jointly examine financial effects and nonfinancial effects on individual subjective well-being, while other studies such as Pedraza, Guzi, and Tijdens (2020) investigate the effects of lockdown (and other nonpharmaceutical measures) or effects of income loss or job loss on mental health issues such as loneliness, anxiety, and boredom. In other words, we examine how psychological effects (including mental health effects) and financial effects jointly affect individual subjective well-being. Third, this study directly links individual subjective well-being with individual-level measures of institutional factors, measured by individuals' agreement with the government's action in dealing with the COVID-19 pandemic. Moreover, using individuals' agreement with government response to the same global event (i.e., the COVID-19 pandemic) makes isolating the effects of particular institutions on individuals' well-being easier (Frey and Stutzer 2000).

The paper is structured as follows. Section 2 provides a review of the literature on the factors determining individual happiness. Section 3 documents the data source, our measurement of variables, and empirical approaches. Section 4 reports the empirical results, and these are followed by concluding remarks in Section 5.

2. LITERATURE REVIEW

Since the manual work of Easterlin (1974), the study of happiness has gradually shifted into the gamut of economics. Since the late 1990s in particular, there has been a growing number of studies that have analyzed the determinants of happiness in different countries and periods (Frey and Stutzer 2010; Graham 2012). According to Frey and Stutzer (2010), studying the economics of happiness is relevant for several reasons. First, people's well-being is an essential component of the economy and society. Economics, by itself, is, or should be, about individual happiness. Second, studying happiness provides new answers to various issues concerning the welfare effects of income, unemployment, and inflation. Such insights help in the design of appropriate economic policies, which may mitigate the costs, including nonpecuniary costs, of achieving individual welfare. Third, happiness research can help governments develop appropriate institutions.

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[1] Negative nonfinancial effects of lockdown include loneliness; boredom; anxiety; troubled sleep; conflicts with friends, family members, and neighbors; and other consequences.

[2] Positive nonfinancial effects of lockdown include more free time, more time with family, less pollution, less noise, and other benefits.

Previous studies have identified sources of individual well-being, including socioeconomic factors, contextual and situational factors, and institutional factors. With regard to socioeconomic factors, studies have shown that women tend to be happier than men, the young and the old are happier than the middle-aged, and even age and happiness have a nonlinear relationship (Appleton and Song 2008; Kusago 2007). While some found that income is also a major determinant of happiness (Frey and Stutzer 2000; Ball and Chernova 2008), others have found that income has only a minor effect or a diminishing effect beyond a certain threshold (Boes and Winkelmann 2010; Clark, Frijters, and Shields 2008; Vendrik and Woltjer 2007). Meanwhile, employment has been found to have a positive impact on life satisfaction, as it is essential for one to work to earn a sufficient living. Clark and Oswald (1994) and Winkelmann and Winkelmann (1998) have shown that unemployment is correlated with substantial unhappiness.

Contextual and situational factors, such as particular employment conditions; stress at the workplace; interpersonal relationships with work colleagues, relatives, and friends; and living conditions and health, also affect life satisfaction (Frey and Stutzer 2000; Rodríguez-Pose and Maslauskaite 2012). There is evidence to suggest that personal and social contact and support, the conditions in areas where people live, and private freedoms are good predictors of happiness and life satisfaction (Bjørnskov 2008; Lim and Putnam 2010; Sujarwoto, Tampubolon, and Pierewan 2018).

In the context of the COVID-19 pandemic, a growing number of studies show that the pandemic and measures to contain the spread of COVID-19 bring about nonfinancial effects, which can ultimately affect one's subjective well-being. Le and Nguyen (2020) use US data and show that the pandemic lockdowns are associated with a variety of adverse psychological outcomes, namely anxiety, worry, disinterest, depression, and poor general health perception. Using longitudinal microdata for the UK over the period 2009–2020, Banks and Xu (2020) find a substantial effect of COVID-19 on mental health at the population level. Similar results are also found in Japan (Yamamura and Tsutsui 2020), the PRC (Wang et al. 2020; Liu et al. 2020), and Spain (Losada-Baltar et al. 2020). Pedraza, Guzi, and Tijdens (2020) examine life dissatisfaction and anxiety during the COVID-19 pandemic in 25 countries and find that job-related changes due to COVID-19 and governments' measures for coronavirus containment are associated with dissatisfaction and anxiety. However, nonpharmaceutical measures also bring about several positive benefits, such as having more family time and interactions, and having time to enjoy personal interests. Moreover, literature also identifies some environmental benefits, such as a reduction in air pollution, improvement of air and water quality, lower noise levels, and reduced land surface temperature (Dang and Trinh 2020; Praveena and Aris 2021). Such positive benefits of lockdown may also influence individuals' well-being.

Institutional factors such as governance, accountability, and effectiveness of governance also determine individual well-being. Previous evidence suggests people are happier with their lives in countries that have better quality of governance (Helliwell 2003; Helliwell and Huang 2008; Helliwell et al. 2018; Ngoo, Tan, and Tey 2021). According to Helliwell et al. (2018), there are two major sets of institutional characteristics that affect individual well-being. The first is related to the reliability and responsiveness of governments in their design and delivery of services. The second set is the presence and pervasiveness of key features of democratic electoral elections and representation. In the context of an unexpected global shock such as the COVID-19 pandemic, the reliability and responsiveness of the government tend to strongly affect people's well-being. If a government's approach to the COVID-19 pandemic is in line with its citizens' expectations, it may improve their happiness.

The COVID-19 pandemic has provided an excellent context in which to analyze individual well-being and happiness. The measures that governments around the world have implemented to contain the spread of COVID-19 have had substantial and far-reaching impacts on people's lifestyles, their employment status, the way they work, their environmental surroundings, and the way they interact and communicate with each other. These changes will have significant financial and nonfinancial effects. These effects are expected to be associated with individual happiness.

This current study contributes to the COVID-19 literature in several aspects. First, in contrast to other studies that examine the effects of nonpharmaceutical measures on individual health issues, this study investigates the effects of mental health issues on individual subjective well-being. Second, our study not only examines the effect of mental health but also the effect of positive consequences of such measures such as having more free time and a less polluted environment on individuals' well-being. Furthermore, we also quantitatively examine the soothing role of enjoying nonfinancial benefits in reducing the likelihood of being unhappy caused by either experiencing negative mental health effects or having lost a job as a result of the outbreak of COVID-19.

Moreover, this study also contributes to the literature on the determinants of happiness in several ways. First, with regard to institutional factors, this study directly links individual subjective well-being with individual-level measures of institutional factors, while previous literature relied on country-level or regional-level institutional factors. These country-level or regional-level factors could be more exogenous to individual well-being than individual-level measures. However, it is more difficult to disentangle the direct effects of institutional factors on individuals' subjective well-being since country-level and regional-level factors may indirectly affect individuals' subjective well-being through other macro-variables such as inflation, employment, and income. Second, in cross-country studies, countries usually differ in many ways. Therefore, it is difficult to isolate the effects of particular institutions on individuals' well-being (Frey and Stutzer 2000). This problem is less acute if the institutional variations occur either within a country or during a major global event such as the COVID-19 pandemic. Our institutional variations are based on variations in the responses of different governments to the same global event, which makes them more appropriate for cross-country analysis.

3. DATA AND EMPIRICAL APPROACH

3.1 Data

Data used in this study were collected in six countries, namely the PRC, Italy, Japan, the Republic of Korea, the UK, and the four largest states in the US (i.e., California, Florida, New York, and Texas). These countries were selected because they were at different stages of the pandemic at the time of the survey, and they had each responded to the pandemic differently. This data set was collected by Belot et al. (2020) with funding from the Creative-Pioneering Researchers Program at Seoul National University, and from the European University Institute. The survey was implemented between 15 and 23 April. Table 1 shows the number of cases in each country by the third week of April and May 2020.

Table 1: Number of Cases in Selected Countries

	23 Apr 20	22 May 20
PRC	82,804	82,971
Republic of Korea	10,708	11,142
Japan	12,829	16,519
Italy	189,973	228,658
United Kingdom	138,078	254,195
United States	862,605	1,589,223

Source: Wikipedia (2020).

In each country, around 1,000 individuals participated in the survey. In total, the sample comprised 6,089 respondents. In each country, the samples were nationally representative of age, gender, and household income (Belot et al. 2020). The data were collected in the third week of April 2020. Potential participants were drawn from several different samples to which the survey firm had access. Individuals were initially contacted via email to participate in the online survey. The survey team invited new individuals to participate in the survey to ensure the representativeness of the sample in three dimensions: age, gender, and household income. [3] The survey contains information on the basic demographic variables of respondents, employment and living situations, health and diseases, self-reports on economic and noneconomic consequences of the pandemic, behavior, beliefs about the pandemic, and responses of the governments. The data are available on the website: https://osf.io/aubkc/.

3.2 Variable Construction

In Table 2, we show how information from the survey is used to construct our independent variables (unhappiness and happiness), mental health issues and positive benefits (i.e., nonfinancial effects), financial effects, and covariates used in our regression analyses.

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[3] Dang and Nguyen (2020) compare the distributions of respondents by gender and age groups in the data set used in this present study and the distributions of these characteristics obtained from the official figures to examine the representativeness of the survey at the country level. They find that while there are some differences in the proportion of respondents in age groups for Japan and the UK, the differences are not large. Moreover, the proportion of respondents in each of five income quantiles is roughly 20%, indicating that the samples are quite equally distributed among income groups.

Table 2: Definition and Measurement of Variables

Variables	Questions in Survey	Measures
Level of happiness (dependent variable)	How happy do you feel these days?[a]	= 1 if the response is "Extremely unhappy" = 2 if the response is "Moderately unhappy" = 3 if the response is "Slightly unhappy" = 4 if the response is "Neither happy nor unhappy" = 5 if the response is "Slightly happy" = 6 if the response is "Moderately happy" = 7 if the response is "Extremely happy"
Being unhappy (dependent variable)	Question: How happy do you feel these days? Answer:	= 1 if the respondent answers either "extremely unhappy," "Moderately unhappy," or "Slightly unhappy." = 0 otherwise (i.e., neither happy nor unhappy; slightly happy; moderately happy; or extremely happy)
Financial/Economic effects: Change in employment status	Have you lost your job or has your activity (as self-employed) been stopped as a consequence of the COVID-19 pandemic?	= 1 if the response is "Yes, permanently" = 2 if the response is "Yes, temporarily" = 3 if the response is "No"
Financial/Economic effects: Household income	Have you experienced a fall in household income as a consequence of the COVID-19 pandemic?	= 1 if the response is "Yes" = 0 if the response is "No"
Negative nonfinancial effects	Have you experienced any negative nonfinancial effects from the societal changes occurring due to the epidemic, such as: 1. Boredom 2. Loneliness 3. Trouble sleeping 4. General anxiety and stress 5. Increased conflict with friends or relatives or neighbor 6. Others?	= 1 if the respondent has experienced at least one negative effect = 0 otherwise
Positive nonnegative effects	Have you experienced any positive nonfinancial effects from the societal changes occurring due to the epidemic, such as (select all that apply): 1. Enjoying more free time 2. Enjoying time with family 3. Reduction of air pollution 4. Reduction of noise pollution 5. Other (please specify)?	= 1 if the respondent has enjoyed at least one positive effect = 0 otherwise
Agreement with government approach	Do you agree with the current approach taken by your government in response to the pandemic?	=1 if response is "Strongly disagree" = 2 if response is "Somewhat disagree" = 3 if response is "Neither agree nor disagree" = 4 if response is "Somewhat agree" = 5 if response is "Strongly agree"
Effectiveness of containment measures	How effective do you believe each of these measures is in reducing the spread of the epidemic? 1. Shutting down schools 2. Shutting down public transport 3. Shutting down nonessential businesses 4. Limiting mobility outside home 5. Forbidding mass gatherings 6. Introducing fines for citizens that don't respect public safety measures 7. Requiring masks to be worn outside by everyone	For each measure, there are five answering options: Not at all effective; Slightly effective; Moderately effective; Very effective; Extremely effective For each of the seven measures, we assigned a score of 0 if the response was "Not effective at all" and a score of 1 otherwise. To calculate variable relating to effectiveness of containment measure, we sum up our newly assigned score for each measure. The aggregate score ranges from zero to seven. For ease of interpretation, we calculated the z-score
Belief: Fraction of infected people	What fraction of people in your local area do you think are currently infected?	Fraction in percentage points (integers 0–100)
Belief: Probability of being infected	What do you think is the probability that you are, or have been, infected with COVID-19?	Probability in percentage points (integers 0–100)

Table 2 *continued*

Variables	Questions in Survey	Measures
Belief: Prob. of infection without symptoms	What do you think is the probability that an infected person develops no symptoms?	Probability in percentage points (integers 0–100)
Belief: Probability of serious illness, not requiring hospitalization	What do you think is the probability that an infected person develops a serious illness (stays in bed) without requiring hospitalization?	Probability in percentage points (integers 0–100)
Belief: Probability of a serious illness, requiring hospitalization	What do you think is the probability that an infected person develops a serious illness that requires hospitalization?	Probability in percentage points % (integers 0-100)
Belief: Probability of dying if infected	What do you think is the probability that an infected person dies?	Probability in percentage points (integers 0–100)
Gender	What is your gender?	= 1 if male = 0 otherwise
Age	How old are you?	= 1 if between 18 and 25 = 2 if between 26 and 35 = 3 if between 36 and 45 = 4 if between 46 and 55 = 5 if between 56 and 65 = 6 if between 66 and 75 = 7 if above 75 = 8 if refused to answer
Income	In what range is the gross annual income of your household?	= 1 if the response is in the range of the first quintile = 2 if the response is in the range of the second quintile = 3 if the response is in the range of the third quintile = 4 if the response is in the range of the fourth quintile = 5 if the response is in the range of the fifth quintile = 6 if the response is "Prefer not to answer"
Living arrangement	Which of the following best describes your current living situation?	1 = Live alone in my home (may have a pet) 2 = Live in a household with other people 3 = Live in a facility such as a nursing home that provides meals and 24-hour nursing care 4 = Temporarily staying with a relative or friend 5 = Temporarily staying in a shelter or homeless
Regions		Dummy variables for 22 provinces in the PRC, 20 provinces in Italy, 8 regions in Japan, 16 provinces in the Republic of Korea, 12 regions in the UK, and 4 states in the US.

[a] This question has been widely used and been validated by previous studies (Frey and Stutzer 2010; Oswald and Wu 2011; Sujarwoto Tampubolon, and Pierewan 2018).

3.3 Summary Statistics

Table 3 presents some summary statistics for the whole sample. The summary statistics for each country are reported in Online Appendix 1. About 37% of respondents reported not being happy at the time the survey was conducted. Notably, nearly half of the Italians in the sample reported being unhappy, while about 30% of Chinese respondents indicated they were unhappy. Of these, 6.63% of the respondents stated that they were extremely unhappy. Italy and the PRC were respectively the two countries with the highest and lowest proportion of individuals who felt extremely unhappy. With regard to negative mental health issues, nearly half of the respondents felt boredom (48%) and anxiety (45%). The proportion of respondents experiencing loneliness, having trouble sleeping, and having conflicts with family members was 26%, 24.7%, and 9%, respectively. Overall, about 80% of individuals

had experienced at least a negative nonfinancial effect caused by nonpharmaceutical measures to contain the spread of COVID-19. Meanwhile, a high proportion of respondents, 85%, reported that they enjoyed at least one positive benefit brought about by lockdown measures. More specifically, about 42% (51%) of respondents reported that they had more free time for themselves (for family). The proportion of respondents that reported less pollution and less noise was 44% and 30%, respectively. Only 5.37% of the sample had lost their job permanently, while nearly 25% had lost their job temporarily. The data also showed that almost 50% had experienced a decline in income. More than 50% of respondents in the sample agreed with their government's approach to the COVID-19 pandemic, while only 15% disagreed. Most individuals in the sample stated that they believed the measures to contain COVID-19 were effective. It is interesting to note that more than one fifth of the sample indicated their belief that those who became infected would die.

Table 3: Summary Statistics: All Countries
Unit: %

	Mean	Std. Dev.
Well-being indicators		
Not happy these days	37.30	48.36
Extremely unhappy	6.63	24.89
Moderately unhappy	11.50	31.90
Slightly unhappy	19.17	39.36
Neither happy nor unhappy	33.01	47.03
Slightly happy	13.47	34.14
Moderately happy	13.17	33.82
Extremely happy	3.05	17.21
Financial and nonfinancial effects		
Experienced negative nonfinancial effects	80.59	39.56
Experienced positive nonfinancial effects	85.65	35.06
Permanent job loss	5.37	22.55
Temporary job loss	24.77	43.17
No change in employment	69.86	45.89
Experienced a fall in household income	49.33	50.00
Agreement with government approach		
Strongly disagree	6.08	23.89
Somewhat disagree	9.20	28.90
Neither agree nor disagree	20.51	40.38
Somewhat agree	32.67	46.90
Strongly agree	31.55	46.47
Effectiveness of containment measures		
Shutting down schools	66.38	47.24
Shutting down public transport	63.44	48.16
Shutting down nonessential businesses	62.70	48.36
Limiting mobility outside home	66.74	47.12
Forbidding mass gatherings	79.90	40.08
Introducing fines for citizens that do not respect public safety measures	63.85	48.05
Requiring masks to be worn outside by everyone	64.67	47.80
Beliefs and perceptions		
Fraction of infected people	21.41	23.19
Probability of infected people without symptoms	34.66	27.09
Probability of serious illness without requiring hospitalization	32.18	25.54
Probability of a serious illness that requires hospitalization	32.68	27.65
Probability that infected people would die	21.80	26.36
Male	48.43	49.98

Source: Author's calculation.

3.4 Empirical Approach

Based on the existing literature, the estimate equation would be as follows:

$$P(Unhappy_i) = \Phi(\alpha_0 + \alpha_1 NegExp_i + \alpha_2 PosExp_i + \alpha_3 JobChn_i$$
$$+\alpha_4 IncShock_i + \alpha_5 Belief_i + \alpha_6 GovPol_i + \alpha_7 X_i) \tag{1}$$

in which $Unhappy_{it}$ is a dummy variable indicating that individual i is unhappy; $PosExp_i$ and $NegExp_{it}$ are two variables capturing the positive and negative nonfinancial effects of the COVID-19 pandemic; $JobChn_{it}$ and $IncShock_{it}$ are two sets of financial effects of the COVID-19 pandemic relating to changes in employment status and household income; $GovPol_{it}$ is a set of five degrees of agreement with the government's approach to dealing with the COVID-19 pandemic; $Belief_{it}$ is a set of people's beliefs regarding the spread of the pandemic in their local area, the risk of getting infected themselves, and the risk of several complications that may arise once a person becomes infected; and X_{it} is a set of socioeconomic factors including individuals' age, gender, regions, living arrangement (such as living alone, living in a household with others, etc.), and income quintiles.

We also estimated an ordered probit model as follows:

$$Happy_i^* = Z'_i * \beta + \eta_i \tag{2}$$

where $Happy_i^*$ is an unobserved latent variable, indicating individual I's happiness; Z_i is a set of independent variables, which include all independent variables in Equation (1), and η_i is the error term. The observed ordinal value of happiness, $Happy_i$ takes on the value 1 (extremely unhappy) through 7 (extremely happy), according to the following scheme:

$$Happy_i = j \iff \mu_{j-1} < Happy_i^* < \mu_j ; j = 1 \dots 7$$

The probability that individual i will select alternative j is:

$$p_{ij} = prob(Happy_i = j) = prob(\mu_{j-1} < Happy_i^* < \mu_j)$$
$$= \Phi(\mu_j - Z'_i * \beta) - \Phi(\mu_{j-1} - Z'_i * \beta) \tag{3}$$

We estimate Equations (1) and (2) using both pooled data (i.e., cross-country) and each country's data.

We further examine the role of experiencing positive nonfinancial benefits in mitigating the potential negative nonfinancial effects caused by the COVID-19 pandemic as follows:

$$P(Unhappy_i) = \Phi(\gamma_0 + \sum_k \gamma_{1k}(NegExp_i \# PosExp_i) + \gamma_2 JobChn_i$$
$$+ \gamma_3 IncShock_i + \gamma_3 Belief_i + \gamma_6 GovPol_i + \gamma_5 X_i) \tag{4}$$

where all variables are similar to those in Equation (1). The differences lie in the factor variables between $NegExp_i$ and $PosExp_i$. Since both variables are binary variables, we have four combinations (i.e., k = 4): (i) not experiencing negative nonfinancial effects and not experiencing positive benefits; (ii) not experiencing negative nonfinancial effects but experiencing positive benefits; (iii) experiencing negative nonfinancial effects but not experiencing any positive benefits; and (iv) experiencing both negative nonfinancial effects and positive benefits. Case (i) could be viewed as the normal state. We expect that experiencing positive nonfinancial effects will reduce the effects of negative nonfinancial effects on being unhappy.

Similarly, we revised Equation (4) to quantify the soothing role of positive nonfinancial effects in the relationship between having lost a job and being unhappy as in Equation (5).

$$P(Unhappy_i) = \Phi(\theta_0 + \theta_1 NegExp_i + \sum_k \theta_{2k}(PosExp_i \# JLost_i)$$
$$+ \theta_3 IncShock_i + \theta_4 Belief_i + \theta_5 GovPol_i + \theta_6 X_i) \tag{5}$$

Similar to Equation (4), the two variables $PosExp_i$ and $JLost_i$ are both binary variables, so we again have four combinations: (i) not experiencing any positive benefits and not losing a job; (ii) experiencing positive benefits but not losing a job; (iii) experiencing positive benefits and having lost a job; and (iv) experiencing positive benefits and having lost a job. State (i) can be viewed as the normal state. We also expect that experiencing positive benefits will reduce the effects of having lost a job on being unhappy.

Before going further, we discuss some caveats that necessitate a cautious interpretation of our empirical results. First, at the time the survey was conducted, each country was at a different stage in the pandemic, and the governments of these countries had taken different approaches to containing COVID-19. For example, by that time, the PRC and the Republic of Korea had appeared to control the spread of COVID-19, while other countries at that stage had only limited control over the virus. In addition, there are other sources of cross-country variations, such as culture, institutions, governments, etc. Therefore, as Belot et al. (2020) suggested, the results of cross-country analyses should be interpreted cautiously. Second, the estimation results could suffer from endogeneity bias. We tried to include as many observable variables in our estimation as possible. Some variables, such as education level, were not collected. Unobservable factors such as personality may also affect both outcome variables (happiness) and independent variables, particularly subjective variables such as nonfinancial effects. Reverse causality may even exist. For example, if people are unhappy, their viewpoints on all aspects measured may be negative, including their government's approach to COVID-19. Therefore, our estimation results should be interpreted as indications of correlation rather than causality.

4. EMPIRICAL RESULTS

Table 4 presents our results estimation of Equation (1) using pooled data (column 1), and samples of Chinese, Korean, Japanese, Italian, British, and American respondents (columns 2 to 7, respectively). Our results show that people who have experienced negative nonfinancial effects (including mental health issues) are more likely to be unhappy than those who have not experienced these effects. Meanwhile, enjoying

positive nonfinancial benefits is negatively associated with being unhappy. The associations between the nonfinancial effects (i.e., either negative or positive effects) brought about by measures to contain the spread of COVID-19 are observed in all countries, except in the case of the PRC and Japan. Chinese and Japanese people who enjoyed at least one positive nonfinancial benefit were not less unhappy than those who did not.[4]

Table 4: Being Unhappy During the COVID-19 Pandemic (Marginal Effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All	PRC	Rep. of Korea	Japan	Italy	UK	US
Negative nonfinancial effects	0.273***	0.236***	0.332***	0.116***	0.368***	0.358***	0.307***
	[0.017]	[0.056]	[0.049]	[0.035]	[0.041]	[0.040]	[0.041]
Positive nonfinancial effects	−0.099***	−0.119	−0.101**	−0.049	−0.169**	−0.121***	−0.104**
	[0.018]	[0.117]	[0.050]	[0.033]	[0.070]	[0.041]	[0.041]
Job loss							
Temporary job lost	−0.034	0.092	−0.206**	−0.032	−0.116**	0.010	−0.050
	[0.029]	[0.068]	[0.088]	[0.094]	[0.057]	[0.068]	[0.060]
No change in employment status	−0.081***	0.072	−0.306***	−0.066	−0.102*	−0.071	−0.085
	[0.028]	[0.070]	[0.086]	[0.087]	[0.058]	[0.067]	[0.060]
Experienced a fall in household income	0.093***	0.119***	0.118***	0.079**	0.092***	0.039	0.077**
	[0.013]	[0.032]	[0.032]	[0.032]	[0.034]	[0.034]	[0.033]
Agreement with the current government approach							
Somewhat disagree	−0.057*	0.034	−0.085	−0.090	−0.081	−0.099	0.020
	[0.032]	[0.236]	[0.089]	[0.059]	[0.069]	[0.084]	[0.074]
Neither agree nor disagree	−0.193***	−0.206	−0.207***	−0.194***	−0.175***	−0.303***	−0.174***
	[0.028]	[0.225]	[0.076]	[0.051]	[0.068]	[0.077]	[0.066]
Somewhat agree	−0.198***	−0.187	−0.270***	−0.180***	−0.153**	−0.318***	−0.171***
	[0.027]	[0.220]	[0.076]	[0.056]	[0.059]	[0.071]	[0.059]
Strongly agree	−0.224***	−0.256	−0.240***	−0.166*	−0.204***	−0.312***	−0.168***
	[0.028]	[0.220]	[0.077]	[0.088]	[0.063]	[0.073]	[0.060]
Effectiveness of containment measures (aggregate, z-score)	0.001	−0.003	0.011	−0.003	−0.027	−0.011	0.019
	[0.006]	[0.017]	[0.018]	[0.013]	[0.018]	[0.016]	[0.015]
Belief							
Fraction of infected people	−0.001**	−0.002**	−0.001	−0.001	−0.001*	0.001	0.000
	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Probability of being infected	0.000	−0.001	0.000	0.001*	0.002**	−0.000	0.001
	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Prob. of infection without symptoms	0.000	0.001	0.001	0.000	−0.000	−0.001	−0.000
	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Probability of serious illness not requiring hospitalization	0.001**	0.003***	−0.001	−0.001	0.000	0.001	−0.000
	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Probability of a serious illness requiring hospitalization	−0.001***	−0.001	−0.000	−0.001	−0.000	−0.001	−0.001
	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Probability of dying if infected	0.001***	0.001	0.002**	0.003***	0.001	0.001	0.000
	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Gender	0.027**	0.026	0.062**	0.087***	−0.041	−0.017	0.034
	[0.012]	[0.028]	[0.031]	[0.030]	[0.030]	[0.029]	[0.031]

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[4] We also constructed other indicators such as negative and positive intensity indices (which are the sum of all negative effects and of all the positive effects that one experiences) and the aggregate nonfinancial effects (which are equal to the positive intensity index minus the negative intensity index). Our estimation results using such indices are qualitatively consistent with the results presented in this section. The results are available upon request.

Table 4 *continued*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All	**PRC**	**Rep. of Korea**	**Japan**	**Italy**	**UK**	**US**
Income groups							
Second quintile	−0.015	−0.003	0.017	0.006	0.004	−0.024	−0.053
	[0.020]	[0.049]	[0.050]	[0.046]	[0.051]	[0.047]	[0.050]
Third quintile	−0.038**	−0.042	−0.065	0.050	0.032	−0.036	−0.132***
	[0.019]	[0.049]	[0.048]	[0.046]	[0.050]	[0.047]	[0.049]
Fourth quintile	−0.041**	−0.090*	−0.029	−0.030	0.061	−0.048	−0.115**
	[0.020]	[0.047]	[0.050]	[0.047]	[0.050]	[0.049]	[0.050]
Fifth quintile	−0.033	−0.069	−0.012	−0.006	0.025	−0.034	−0.095*
	[0.021]	[0.052]	[0.053]	[0.052]	[0.056]	[0.051]	[0.056]
Preferred not to say	−0.003		−0.013	0.018	0.156	0.003	−0.102
	[0.042]		[0.076]	[0.089]	[0.108]	[0.110]	[0.116]
N	6,085	994	962	1,011	1,042	1,015	1,054

Note: Dependent variable is being unhappy, a dummy variable that takes value of 1 if the individual reported being "Extremely unhappy," "Moderately unhappy," or "Slightly unhappy." Standard errors in brackets; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Negative nonfinancial effect and positive nonfinancial effect are two dummy variables if individuals experience negative feeling or enjoy positive activities during the pandemic. The reference group for job loss variables is groups of those that lost job permanently because of COVID-19. Experienced a fall in household income is a dummy variable indicating those who experienced reduction in household income because of the pandemic. The reference groups for degree of agreement with government approach are those who strongly disagree (with the government approach). Effectiveness of containment measures is the number of measures that respondents think are effective in containing virus. We calculate z-score for this variable. The reference group for income groups is group of those who are in the first quintile (poorest). In all specifications, we controlled for individual age, living arrangement, whether they had contact with any infected person, whether they had any COVID-19 symptom, whether they accessed open-air areas in their living areas, whether they had traveled abroad since January 2020, whether they kept a distance from their colleagues and the city/province/prefecture where they live.

Source: Belot et al.'s (2020) data and author's estimation.

Financial effects are also associated with happiness and unhappiness. Our estimation shows that experiencing a decline in household income is positively correlated with unhappiness. This association is observed in almost all countries (except for the UK), although the estimated coefficients differed from country to country. A fall in household income increases the likelihood of being unhappy among Korean and Chinese people by 12.2 and 11.5 percentage points, while the figures for Japanese, Italian, and American people vary by only 7.5 to 9 percentage points. The difference may reflect the increased effectiveness of the social welfare net among the latter group of countries compared to the Republic of Korea and the PRC.

Those who enjoyed no change in employment status are less likely to be unhappy than those who had lost their jobs, while no difference could be observed between those who had lost their job temporarily and those who had lost their job permanently. However, the estimated coefficients on job status variables seem to be driven by the Korean and Italian samples since we do not observe any significant association between employment status and unhappiness in the PRC, Japan, the UK, and the US.

Individuals' unhappiness is negatively associated with the extent to which they agreed with their government's approach to the pandemic. For example, those who strongly agreed with their government's approach were more likely to be happy than those who strongly disagreed, by 22.9 percentage points. This association is observed in all countries, except the PRC, where the extent to which people agreed with the PRC government's approach is not related to their unhappiness. Our empirical results, however, show that people's perceptions of the effectiveness of containment measures are not correlated with their unhappiness.

Similarly, our results using a pooled sample also show that belief about the severity of the pandemic where people live and the risk of several kinds of complications are associated with being unhappy, but the magnitude of this correlation is quite small. The associations among these variables and people's unhappiness also differ from country to country and are somewhat limited.

With respect to other control variables, we find that men seem to be more unhappy than women, especially among Korean and Japanese people. This is partly because the financial burden on Korean and Japanese people seems to be greater since Japanese and Korean women tend to leave the labor force when they get married. During the pandemic, those in the wealthier quintiles are less likely to be unhappy than those in the poorer quintiles. However, this correlation appears to be driven by the US sample since we do not observe an association between the income quintile and unhappiness in other countries.

Table 5: Nonfinancial Effects and Being Unhappy (Marginal Effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All	PRC	Rep. of Korea	Japan	Italy	UK	US
Boredom	0.079***	0.119***	0.060*	−0.009	0.077***	0.079***	0.100***
	[0.012]	[0.028]	[0.031]	[0.032]	[0.029]	[0.027]	[0.029]
Loneliness	0.149***	0.091***	0.185***	0.156***	0.196***	0.148***	0.081***
	[0.013]	[0.029]	[0.038]	[0.043]	[0.029]	[0.030]	[0.030]
Trouble sleeping	0.096***	0.073**	0.052	0.083	0.104***	0.141***	0.104***
	[0.014]	[0.030]	[0.045]	[0.052]	[0.030]	[0.028]	[0.030]
General anxiety and stress	0.160***	0.164***	0.167***	0.051*	0.242***	0.159***	0.157***
	[0.012]	[0.027]	[0.029]	[0.030]	[0.027]	[0.028]	[0.029]
Conflict with friends, relatives, or neighbors	0.042**	0.003	0.135***	0.059	0.014	0.071	0.050
	[0.020]	[0.048]	[0.052]	[0.054]	[0.048]	[0.049]	[0.049]
Other negative feelings	0.030		0.058	−0.023	0.068	0.128	−0.019
	[0.044]		[0.114]	[0.095]	[0.121]	[0.124]	[0.084]
Enjoying more free time	−0.077***	−0.008	−0.115***	0.021	−0.080***	−0.130***	−0.147***
	[0.012]	[0.032]	[0.033]	[0.033]	[0.030]	[0.028]	[0.029]
Enjoying time with family	−0.060***	−0.062*	−0.011	−0.028	−0.045	−0.108***	−0.080***
	[0.013]	[0.036]	[0.032]	[0.033]	[0.030]	[0.030]	[0.030]
Reduction of air pollution	−0.013	0.028	−0.065**	−0.028	−0.002	−0.006	0.001
	[0.014]	[0.031]	[0.032]	[0.044]	[0.038]	[0.032]	[0.032]
Reduction of noise pollution	−0.031**	−0.031	−0.073*	0.076	−0.068**	0.009	−0.061*
	[0.015]	[0.033]	[0.040]	[0.055]	[0.033]	[0.034]	[0.035]
Other positive effects	−0.059	0.195	−0.010	0.048	−0.104	−0.094	−0.127
	[0.045]	[0.214]	[0.130]	[0.111]	[0.115]	[0.101]	[0.082]
Other covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	6,085	993	962	1,011	1,042	1,015	1,054

Note: Dependent variable is being unhappy, a dummy variable that takes value of 1 if the individual reported "Extremely unhappy," "Moderately unhappy," or "Slightly unhappy." Standard errors in brackets; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. This table is similar to Table 4 (please refer to note to Table 4), except that we replace two dummy variables indicating negative and positive nonfinancial effects with indicators indicating that individuals experience each of six negative feelings and enjoy each of five positive activities.

Source: Belot et al.'s (2020) data and author's estimations.

Further Analysis

Table 5 details how each indicator of the negative and positive nonfinancial effects/benefits brought about by nonpharmaceutical measures to deal with the COVID-19 pandemic is associated with individual unhappiness. Our results show that almost all negative nonfinancial effects are positively associated with being unhappy. In nearly all countries, experiencing boredom, loneliness, having trouble sleeping, and

general anxiety and stress are positively correlated with being unhappy. Having conflicts with friends, relatives, and neighbors is positively associated with unhappiness only among Koreans. Among positive benefits, we find that those who enjoyed more free time (and more time with family) and a cleaner environment brought about by the lockdown measures are less likely to be unhappy. However, the relationship between each positive benefit and unhappiness differs from country to country. For example, none of the perceived positive benefits caused by the lockdown measures makes Japanese people happier, while among all perceived positive benefits, only enjoying more time with family seems to make Chinese people less unhappy.

Table 6 reports our estimation results for Equation (2), using an ordered probit model and pooled sample.[5] Our results show that both the nonfinancial and financial effects of the COVID-19 pandemic are associated with the level of happiness. Those experiencing negative nonfinancial effects have a lower level of happiness than those who did not experience such effects. Meanwhile, enjoying positive nonfinancial benefits such as having more free time and a cleaner environment is positively associated with a higher level of happiness. Those who lost their job permanently due to the pandemic have a lower level of happiness than those whose employment status remained unchanged. Those who agreed with their government's approach to the COVID-19 pandemic tended to have a higher level of happiness than those who strongly disagreed with the government's approach. In general, the results obtained from the ordered probit model are consistent with the results using the probit model, using either the pooled sample or each country sample.

Soothing Role of Positive Nonfinancial Benefits

Table 7 presents our results estimation of Equations (4) and (5) using pooled data (column 1), and the sample of Chinese, Korean, Japanese, Italian, British, and American respondents (columns 2 to 7, respectively). For the sake of brevity, we present only the estimates for the combinations of experiencing positive and negative nonfinancial effects (Panel A) and of experiencing positive nonfinancial effects and having lost a job (Panel B). The reference group in Panel A is the group of those who did not experience both negative and positive nonfinancial effects while that in Panel B is the group of those who did not experience positive nonfinancial effects and did not lose their jobs. The empirical results corroborate the results presented earlier that enjoying positive benefits (or experiencing negative nonfinancial effects) caused by nonpharmaceutical measures to contain the spread of COVID-19 is associated with a lower (higher) likelihood of being unhappy, Moreover, among those who experienced negative nonfinancial effects, those enjoying positive benefits have a lower likelihood of being unhappy, thereby indicating the soothing role of positive nonfinancial effects in the relationship between enjoying benefits and happiness. However, the soothing role of positive nonfinancial benefits is not observed in all countries in our sample. In the PRC, experiencing positive and negative nonfinancial effects did not affect people's happiness. Meanwhile in Japan, among those who did not experience negative nonfinancial effects, experiencing positive nonfinancial effects reduced their likelihood of being unhappy. In Italy and in the UK, experiencing positive nonfinancial effects was not related to happiness among those who did not experience negative financial effects. Moreover, among Italians who experienced negative nonfinancial effects, not having experienced any positive nonfinancial effects increased their likelihood of being unhappy.

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[5]   The results using each country sample are presented in Online Appendices OA2–OA7.

Table 6: Individual Happiness during the COVID-19 Pandemic
(Pooled Sample, Marginal Effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Extremely Unhappy	Moderately Unhappy	Slightly Unhappy	Neither Happy nor Unhappy	Slightly Happy	Moderately Happy	Extremely Happy
Negative nonfinancial effects	0.084***	0.087***	0.073***	−0.021***	−0.066***	−0.113***	−0.044***
	[0.005]	[0.005]	[0.004]	[0.003]	[0.004]	[0.006]	[0.003]
Positive nonfinancial effects	−0.039***	−0.040***	−0.034***	0.010***	0.030***	0.052***	0.020***
	[0.005]	[0.005]	[0.004]	[0.002]	[0.004]	[0.007]	[0.003]
Job loss							
Temporary job lost	−0.015	−0.014*	−0.010*	0.007	0.011*	0.016*	0.005*
	[0.009]	[0.008]	[0.006]	[0.005]	[0.006]	[0.009]	[0.003]
No change in employment status	−0.028***	−0.027***	−0.021***	0.010**	0.021***	0.033***	0.012***
	[0.009]	[0.008]	[0.006]	[0.005]	[0.006]	[0.009]	[0.003]
Experienced a fall in household income	0.027***	0.028***	0.023***	−0.007***	−0.021***	−0.036***	−0.014***
	[0.004]	[0.004]	[0.003]	[0.001]	[0.003]	[0.005]	[0.002]
Agreement with the current government's approach							
Somewhat disagree	−0.046***	−0.030***	−0.011***	0.031***	0.024***	0.026***	0.006***
	[0.014]	[0.009]	[0.003]	[0.010]	[0.007]	[0.008]	[0.002]
Neither agree nor disagree	−0.085***	−0.065***	−0.034***	0.052***	0.051***	0.064***	0.017***
	[0.013]	[0.008]	[0.004]	[0.009]	[0.006]	[0.007]	[0.002]
Somewhat agree	−0.093***	−0.075***	−0.042***	0.055***	0.058***	0.076***	0.022***
	[0.012]	[0.008]	[0.003]	[0.009]	[0.006]	[0.007]	[0.002]
Strongly agree	−0.108***	−0.094***	−0.060***	0.055***	0.072***	0.102***	0.032***
	[0.013]	[0.008]	[0.004]	[0.009]	[0.006]	[0.008]	[0.003]
Effectiveness of measures (aggregate, z-score)	−0.004**	−0.004**	−0.003**	0.001**	0.003**	0.005**	0.002**
	[0.002]	[0.002]	[0.001]	[0.000]	[0.001]	[0.002]	[0.001]
Belief							
Fraction of infected people	−0.000**	−0.000**	−0.000**	0.000**	0.000**	0.000**	0.000**
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of being infected	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of infected people with no symptoms	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of serious illness without requiring hospitalization	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of a serious illness that requires hospitalization	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability that infected people would die	0.000***	0.000***	0.000***	−0.000***	−0.000***	−0.000***	−0.000***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Male	0.005	0.005	0.004	−0.001	−0.004	−0.007	−0.003
	[0.003]	[0.003]	[0.003]	[0.001]	[0.003]	[0.004]	[0.002]
Income groups							
Second quintile	−0.012**	−0.011**	−0.009**	0.004**	0.009**	0.014**	0.005**
	[0.006]	[0.006]	[0.004]	[0.002]	[0.004]	[0.007]	[0.002]
Third quintile	−0.016***	−0.016***	−0.013***	0.006***	0.012***	0.020***	0.007***
	[0.006]	[0.005]	[0.004]	[0.002]	[0.004]	[0.007]	[0.002]
Fourth quintile	−0.021***	−0.022***	−0.018***	0.006***	0.016***	0.027***	0.010***
	[0.005]	[0.006]	[0.004]	[0.002]	[0.004]	[0.007]	[0.003]
Fifth quintile	−0.021***	−0.021***	−0.017***	0.006***	0.016***	0.027***	0.010***
	[0.006]	[0.006]	[0.005]	[0.002]	[0.005]	[0.007]	[0.003]
Preferred not to say	−0.003	−0.003	−0.002	0.001	0.002	0.004	0.001
	[0.013]	[0.012]	[0.009]	[0.005]	[0.009]	[0.014]	[0.005]
Number of observations				6,085			

Note: Dependent variable is ordinal degree of happiness ranging from extremely unhappy to extremely happy. Standard errors in brackets; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All covariates used in this table are similar to those in Table 4. Please refer to note to Table 4.

Source: Belot et al.'s (2020) data and author's estimations.

Table 7: Soothing Role of Enjoying Positive Nonfinancial Effects

	(1)	(2)	(3) Rep. of Korea	(4)	(5)	(6)	(7)
	All	PRC		Japan	Italy	UK	US
Panel A: Negative and positive nonfinancial effects							
Negative No; Positive Yes	−0.133***	−0.145	−0.115*	−0.099*	−0.165	−0.013	−0.100*
	[0.027]	[0.109]	[0.067]	[0.053]	[0.127]	[0.053]	[0.060]
Negative Yes; Positive No	0.211***		0.275***	0.072	0.325**	0.447***	0.289***
	[0.032]		[0.084]	[0.050]	[0.147]	[0.068]	[0.071]
Negative Yes; Positive Yes	0.132***	0.061	0.193***	0.050	0.181	0.285***	0.176***
	[0.026]	[0.108]	[0.061]	[0.045]	[0.125]	[0.052]	[0.058]
Job loss							
Temporary job lost	−0.029	0.065	−0.202**	−0.020	−0.109*	−0.009	−0.035
	[0.028]	[0.072]	[0.087]	[0.092]	[0.057]	[0.068]	[0.059]
No job lost	−0.073***	0.040	−0.304***	−0.054	−0.091	−0.073	−0.072
	[0.028]	[0.073]	[0.085]	[0.085]	[0.058]	[0.067]	[0.059]
Panel B: Job loss and positive nonfinancial effects							
Negative experience	0.272***	0.243***	0.330***	0.114***	0.369***	0.362***	0.311***
	[0.017]	[0.055]	[0.049]	[0.035]	[0.040]	[0.039]	[0.041]
Job loss No; Positive Yes	−0.089***	−0.179	−0.108*	−0.039	−0.174**	−0.083*	−0.092**
	[0.021]	[0.132]	[0.060]	[0.034]	[0.081]	[0.047]	[0.047]
Job loss Yes; Positive No	0.141***		0.108	0.111	−0.044	0.288***	0.163
	[0.050]		[0.107]	[0.108]	[0.142]	[0.110]	[0.106]
Job loss Yes; Positive Yes	−0.047*	−0.157	0.020	−0.013	−0.168**	−0.034	−0.057
	[0.024]	[0.133]	[0.069]	[0.053]	[0.085]	[0.056]	[0.055]
Number of observations	6,085	994	962	1,011	1,042	1,015	1,054

Note: Dependent variable is being unhappy, a dummy variable that takes value of 1 if the individual reported "Extremely unhappy," "Moderately unhappy," or "Slightly unhappy." Standard errors in brackets; * p < 0.1, ** p < 0.05, *** p < 0.01. All covariates used in this table (not presented for brevity) are similar to those in Table 4. Please refer to note to Table 4.
Source: Belot et al.'s (2020) data and author's estimations.

The results in Panel B, Table 7 also suggest the soothing role of enjoying positive nonfinancial benefits in the relationship between having lost a job and happiness. Among those who did lose their jobs, individuals who experienced positive nonfinancial effects were less likely to be unhappy than those who did not. The soothing role of experiencing positive nonfinancial effects, however, is not observed in all countries. Experiencing nonfinancial effects is associated with being happy among those who did not lose jobs in the Republic of Korea, Italy, the UK, and the US, but not in the PRC and Japan. Meanwhile, among those who lost jobs, experiencing positive nonfinancial benefits was associated with being happier in only Italy and the UK and not in the other four countries.

Table 8 reports the soothing role of positive nonfinancial benefits of nonpharmaceutical intervention measures in the relationship between experiencing negative nonfinancial effects and levels of happiness (Panel A) and between having lost a job and levels of happiness (Panel B). The results are obtained from estimating ordered probit models using the pooled sample. Our results show that, among those who did experience negative nonfinancial effects, those who enjoyed positive nonfinancial benefits were more likely to have a higher level of happiness. We also observe a similar pattern in Panel B, in which experiencing positive nonfinancial effects plays a positive soothing role in the relationship between having lost a job and the level of happiness. Enjoying positive benefits brought about by lockdown measures increases the level of happiness of those who lost their jobs as a result of the pandemic.

**Table 8: Soothing Role of Enjoying Positive Nonfinancial Effects:
Levels of Happiness**

	(1) Extremely Unhappy	(2) Moderately Unhappy	(3) Slightly Unhappy	(4) Neither Happy nor Unhappy	(5) Slightly Happy	(6) Moderately Happy	(7) Extremely Happy
Panel A: Negative and Positive Consequences							
Negative No; Positive Yes	−0.023***	−0.039***	−0.054***	−0.037***	0.025***	0.081***	0.047***
	[0.005]	[0.007]	[0.009]	[0.006]	[0.005]	[0.013]	[0.007]
Negative Yes; Positive No	0.078***	0.080***	0.063***	−0.030***	−0.063***	−0.097***	−0.030***
	[0.010]	[0.009]	[0.008]	[0.007]	[0.007]	[0.012]	[0.005]
Negative Yes; Positive Yes	0.033***	0.040***	0.039***	−0.003	−0.031***	−0.056***	−0.020***
	[0.005]	[0.007]	[0.008]	[0.002]	[0.005]	[0.011]	[0.005]
Job loss							
Temporary job lost	−0.013	−0.012	−0.009	0.006	0.010	0.014	0.005
	[0.009]	[0.008]	[0.006]	[0.004]	[0.006]	[0.009]	[0.003]
No job lost	−0.025***	−0.024***	−0.019***	0.009**	0.019***	0.030***	0.011***
	[0.009]	[0.008]	[0.006]	[0.004]	[0.006]	[0.009]	[0.003]
Panel B: Job lost and positive nonfinancial effects							
Negative experience	0.083***	0.086***	0.072***	−0.021***	−0.065***	−0.112***	−0.043***
	[0.005]	[0.005]	[0.004]	[0.003]	[0.004]	[0.006]	[0.003]
Job loss No; Positive Yes	−0.038***	−0.037***	−0.028***	0.014***	0.028***	0.045***	0.016***
	[0.007]	[0.006]	[0.004]	[0.004]	[0.004]	[0.006]	[0.002]
Job loss Yes; Positive No	0.075***	0.047***	0.018***	−0.047***	−0.038***	−0.044***	−0.011***
	[0.024]	[0.013]	[0.004]	[0.016]	[0.010]	[0.011]	[0.003]
Job loss Yes; Positive Yes	−0.028***	−0.026***	−0.018***	0.012***	0.020***	0.030***	0.010***
	[0.008]	[0.007]	[0.005]	[0.004]	[0.005]	[0.008]	[0.003]
Number of observations	6,085	6,085	6,085	6,085	6,085	6,085	6,085

Note: Dependent variable is ordinal degree of happiness ranging from extremely unhappy to extremely happy. Standard errors in brackets; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All covariates used in this table (not presented for brevity) are similar to those in Table 4. Please refer to note to Table 4.

Source: Belot et al.'s (2020) data and author's estimation.

5. CONCLUSION

The COVID-19 pandemic has provided an excellent context in which to analyze individual well-being and happiness. The measures that governments around the world have implemented to contain the spread of COVID-19 have had substantial and far-reaching impacts on people's lifestyles, their employment status, the way they work, their environmental surroundings, and the way they interact and communicate with each other. Such changes have had significant financial and nonfinancial effects. This paper has examined factors that are associated with the unhappiness of individuals in six countries during the COVID-19 pandemic: the PRC, the Republic of Korea, Japan, Italy, the UK, and the four largest states in the US. Using data collected during the third week of April 2020, we found that, on average, both COVID-19-induced financial effects such as job loss or a decline in income and nonfinancial effects such as enjoying positive benefits or experiencing negative nonfinancial effects (including mental health issues) caused by nonpharmaceutical measures to contain the spread of COVID-19 were associated with individual subjective well-being. We also found that enjoying positive benefits such as more free time or a less polluted environment may reduce the likelihood of being unhappy for those who have experienced negative mental health issues or lost their job.

Being happy is also positively associated with the extent to which an individual agrees with their government's approach to the COVID-19 pandemic. Meanwhile, happiness was not found to be strongly associated with individuals' belief in the severity of the pandemic or the risk of complications arising once a person is infected. Our estimation results suggest that the magnitude of the correlation between each of the above factors and happiness differs from country to country. The results were quite consistent regardless of the estimation methods we used (either probit or ordered probit with an ordinal degree of happiness).

The effects, however, were different from country to country. One may argue that the difference may be due to the differences in the exposure to COVID-19 across countries and differences in measures adopted by each country's government to contain the spread of the virus. In fact, in April 2020, Asian countries were quite successful in containing the spread of COVID-19. Different from the PRC, Japan and the Republic of Korea did not use strict measures such as complete lockdown or nationwide school closures. Meanwhile, European and some US states adopted stricter measures. But we think that such differences only partially explained the differences in the effects. The differences may also lie in the differences in the structure of the economy and the cultural differences. For example, in Japan, the proportion of single households is quite high, so lockdown measures would change people's lifestyle only slightly.

Our empirical results have several policy implications. First, governments should not only focus on mitigating the financial and economic effects of the pandemic but also take into account nonfinancial effects since both financial and nonfinancial effects are strongly associated with individual well-being. Second, having an appropriate set of policies to deal with the crisis is not enough to improve people's well-being. The government should either provide evidence of the effectiveness of such policies to the public or convey their message more effectively to garner support from their citizens for their policies. This will help to improve individuals' well-being and thus social welfare.

As mentioned in the empirical approach, the present study had several limitations. First, at the time the survey was conducted, the countries in the sample were at different stages in the pandemic. Moreover, there are other sources of cross-country variation, such as culture, institutions, governments, etc. Therefore, the results of cross-country analyses should be interpreted cautiously. Second, although we tried to include as many observable variables in our estimation as possible, some variables, such as education level, were not collected. Furthermore, unobservable factors such as personality may also affect both outcome variables (happiness) and independent variables, especially subjective variables such as nonfinancial effects. Therefore, the estimation results could suffer from omitted variable biases. Reverse causality may even exist. For example, if people are unhappy, their viewpoints on all aspects measured may be negative, including their government's approach to COVID-19. Therefore, our estimation results should be interpreted as indications of correlation rather than causality.

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APPENDICES

Table OA1: Summary Statistics for Each Country

		PRC	Italy	Japan	Rep. of Korea	UK	US
Well-being indicators							
Not happy these days	Mean	30.12	46.07	35.07	39.77	37.01	35.55
	Sd.	45.90	49.87	47.74	48.97	48.31	47.89
Extremely unhappy	Mean	2.31	11.02	6.01	6.33	6.99	6.92
	Sd.	15.03	31.32	23.78	24.37	25.51	25.39
Moderately unhappy	Mean	7.73	15.90	8.97	11.53	11.61	12.99
	Sd.	26.72	36.59	28.58	31.95	32.06	33.63
Slightly unhappy	Mean	20.08	19.16	20.10	21.91	18.41	15.64
	Sd.	40.08	39.37	40.09	41.39	38.77	36.34
Neither happy nor unhappy	Mean	24.70	36.78	42.27	45.69	24.70	24.64
	Sd.	43.15	48.24	49.42	49.84	43.15	43.11
Slightly happy	Mean	22.59	7.38	14.29	7.17	16.04	13.36
	Sd.	41.84	26.15	35.01	25.80	36.72	34.04
Moderately happy	Mean	17.67	8.43	7.00	6.33	19.09	20.09
	Sd.	38.16	27.80	25.52	24.37	39.32	40.09
Extremely happy	Mean	4.92	1.34	1.38	1.04	3.15	6.35
	Sd.	21.64	11.51	11.67	10.14	17.47	24.40
Financial and nonfinancial effects							
Experienced negative nonfinancial effects	Mean	86.75	82.47	72.91	84.11	77.66	79.91
	Sd.	33.92	38.04	44.47	36.58	41.67	40.09
Experienced positive nonfinancial effects	Mean	97.89	94.92	65.02	87.85	84.65	83.70
	Sd.	97.89	94.92	65.02	87.85	84.65	83.70
Permanent job loss	Mean	3.41	8.24	3.15	3.74	5.22	8.15
	Sd.	18.17	27.51	17.48	18.98	22.25	27.38
Temporary job loss	Mean	39.76	28.64	11.33	21.29	23.43	24.17
	Sd.	48.96	45.23	31.71	40.96	42.37	42.83
No change in employment	Mean	56.83	63.12	85.52	74.97	71.36	67.68
	Sd.	49.56	48.27	35.21	43.34	45.23	46.79
Experienced a fall in household income	Mean	60.34	57.85	38.62	47.66	42.81	48.63
	Sd.	48.94	49.40	48.71	49.97	49.51	50.00
Agreement with government approach							
Strongly disagree	Mean	0.40	8.43	11.13	4.78	4.13	7.30
	Sd.	6.33	27.80	31.47	21.34	19.92	26.02
Somewhat disagree	Mean	2.31	10.63	16.85	8.20	8.27	8.72
	Sd.	15.03	30.84	37.45	27.46	27.55	28.23
Neither agree nor disagree	Mean	5.62	11.69	46.40	29.80	14.07	16.11
	Sd.	23.05	32.14	49.90	45.76	34.79	36.78
Somewhat agree	Mean	28.51	38.31	21.67	28.35	41.83	36.68
	Sd.	45.17	48.64	41.22	45.09	49.35	48.22
Strongly agree	Mean	63.15	30.94	3.94	28.87	31.69	31.18
	Sd.	48.26	46.25	19.47	45.34	46.55	46.35

Table OA1 *continued*

		PRC	Italy	Japan	Rep. of Korea	UK	US
Effectiveness of containment measures							
Shutting down schools	Mean	75.80	78.16	48.47	66.25	54.63	74.50
	Sd.	42.85	41.34	50.00	47.31	49.81	43.61
Shutting down public transport	Mean	71.59	74.62	56.75	37.49	65.16	73.18
	Sd.	45.12	43.54	49.57	48.43	47.67	44.33
Shutting down nonessential businesses	Mean	79.22	73.08	55.37	33.75	65.06	68.06
	Sd.	40.60	44.37	49.74	47.31	47.70	46.65
Limiting mobility outside home	Mean	75.30	74.43	62.66	49.64	68.80	68.63
	Sd.	43.15	43.65	48.39	50.02	46.35	46.42
Forbidding mass gatherings	Mean	80.02	86.21	70.25	84.11	80.22	78.67
	Sd.	40.01	34.50	45.74	36.58	39.86	40.98
Introducing fines for citizens	Mean	73.29	73.28	48.67	71.55	59.06	57.82
	Sd.	44.27	44.27	50.01	45.14	49.20	49.41
Requiring masks to be worn outside by everyone	Mean	84.04	74.04	52.91	81.41	32.38	64.27
	Sd.	36.65	43.86	49.94	38.92	46.82	47.94
Beliefs and perceptions							
Fraction of infected people	Mean	11.87	19.34	32.74	13.83	23.13	26.81
	Sd.	16.95	22.00	23.12	19.25	22.43	26.85
Probability of being infected with COVID-19	Mean	9.99	13.74	19.82	10.72	22.26	21.48
	Sd.	16.61	22.53	22.52	17.62	26.21	28.25
Probability of infected people with no symptoms	Mean	21.64	41.19	41.07	29.46	33.62	40.06
	Sd.	23.03	27.57	26.55	25.70	24.86	28.50
Probability of serious illness w/o hospitalization	Mean	22.33	31.35	32.68	29.03	36.16	40.87
	Sd.	22.98	25.17	23.27	25.56	24.40	27.56
Probability of a serious illness with hospitalization	Mean	35.40	31.12	28.16	28.79	31.79	40.38
	Sd.	30.81	26.33	23.47	27.93	25.17	29.63
Probability that infected people would die	Mean	19.18	25.12	15.34	15.41	24.56	30.39
	Sd.	24.86	27.98	20.75	22.70	26.46	30.34
Male	Mean	49.00	50.86	48.17	50.16	49.16	43.45
	Sd.	50.02	50.02	49.99	50.03	50.02	49.59

Source: Belot et al.'s (2020) data and author's calculation.

Table OA2: Individual Happiness during the COVID-19 Pandemic (Chinese Sample, Marginal Effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Extremely Unhappy	Moderately Unhappy	Slightly Unhappy	Neither Happy nor Unhappy	Slightly Happy	Moderately Happy	Extremely Happy
Negative nonfinancial effects	0.041***	0.086***	0.124***	0.033***	−0.070***	−0.144***	−0.070***
	[0.009]	[0.015]	[0.019]	[0.007]	[0.012]	[0.021]	[0.012]
Positive nonfinancial effects	−0.002	−0.005	−0.007	−0.002	0.004	0.008	0.004
	[0.013]	[0.028]	[0.040]	[0.011]	[0.023]	[0.047]	[0.023]
Job loss							
Temporary job lost	0.008	0.018	0.026	0.008	−0.014	−0.031	−0.015
	[0.008]	[0.019]	[0.031]	[0.012]	[0.014]	[0.036]	[0.020]
No job lost	0.004	0.008	0.013	0.005	−0.006	−0.015	−0.008
	[0.008]	[0.019]	[0.031]	[0.012]	[0.014]	[0.037]	[0.020]
Experienced a fall in household income	0.013***	0.027***	0.039***	0.010***	−0.022***	−0.045***	−0.022***
	[0.005]	[0.009]	[0.012]	[0.004]	[0.007]	[0.014]	[0.007]
Agreement with the current government's approach							
Somewhat disagree	0.018	0.021	0.013	−0.010	−0.019	−0.018	−0.005
	[0.064]	[0.082]	[0.058]	[0.034]	[0.075]	[0.075]	[0.020]
Neither agree nor disagree	−0.031	−0.050	−0.049	0.007	0.045	0.058	0.019
	[0.058]	[0.077]	[0.059]	[0.030]	[0.071]	[0.075]	[0.021]
Somewhat agree	−0.031	−0.049	−0.049	0.007	0.045	0.057	0.019
	[0.058]	[0.076]	[0.057]	[0.029]	[0.070]	[0.072]	[0.020]
Strongly agree	−0.043	−0.074	−0.084	−0.002	0.066	0.099	0.038*
	[0.058]	[0.076]	[0.057]	[0.029]	[0.070]	[0.072]	[0.020]
Effectiveness of measures (aggregate, z-score)	−0.005**	−0.010**	−0.015**	−0.004**	0.008**	0.017**	0.008**
	[0.002]	[0.005]	[0.006]	[0.002]	[0.004]	[0.008]	[0.004]
Belief							
Fraction of infected people	−0.000**	−0.001**	−0.001**	−0.000**	0.001**	0.001**	0.001**
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]
Probability of being infected	−0.000	−0.000	−0.001	−0.000	0.000	0.001	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]
Probability of infected people with no symptoms	0.000	0.000	0.000	0.000	−0.000	−0.001	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of serious illness without requiring hospitalization	0.000***	0.001***	0.001***	0.000**	−0.000***	−0.001***	−0.000***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of a serious illness that requires hospitalization	−0.000	−0.000	−0.000	−0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability that infected people would die	0.000	0.000	0.000	0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Male	0.003	0.007	0.010	0.003	−0.006	−0.012	−0.006
	[0.004]	[0.007]	[0.011]	[0.003]	[0.006]	[0.012]	[0.006]
Income groups							
Second quintile	−0.012	−0.022	−0.027*	−0.003	0.020	0.032	0.013
	[0.008]	[0.014]	[0.017]	[0.003]	[0.012]	[0.019]	[0.008]
Third quintile	−0.015*	−0.029**	−0.037**	−0.005	0.025**	0.042**	0.018**
	[0.008]	[0.014]	[0.017]	[0.004]	[0.012]	[0.020]	[0.009]
Fourth quintile	−0.021***	−0.041***	−0.056***	−0.012**	0.035***	0.065***	0.030***
	[0.008]	[0.014]	[0.018]	[0.005]	[0.011]	[0.020]	[0.010]
Fifth quintile	−0.021**	−0.041***	−0.055***	−0.011**	0.034***	0.064***	0.030***
	[0.008]	[0.015]	[0.019]	[0.006]	[0.012]	[0.022]	[0.011]
Preferred not to say	−0.023	−0.047	−0.066	−0.016	0.039	0.076	0.037
	[0.027]	[0.066]	[0.116]	[0.056]	[0.043]	[0.137]	[0.084]
Number of observations				996			

Note: Dependent variable is ordinal degree of happiness ranging from extremely unhappy to extremely happy. Standard errors in brackets; * p < 0.1, ** p < 0.05, *** p < 0.01. Negative nonfinancial effect and positive nonfinancial effect are two dummy variables if individuals experience negative feeling or enjoy positive activities during the pandemic. The reference group for job loss variables is groups of those that lost job permanently because of COVID-19. Experienced a fall in household income is a dummy variable indicating those who experienced reduction in household income because of the pandemic. The reference group for degree of agreement with government approach is those who strongly disagree (with the government approach). Effectiveness of containment measures is the number of measures that respondents think are effective in containing virus. We calculate z-score for this variable. The reference group for income groups is group of those who are in the first quintile (poorest). In all specifications, we controlled for individual age, living arrangement, whether they made contact with any infected person, whether they had any COVID-19 symptoms, whether they accessed open-air areas in their living areas, whether they had traveled abroad since January 2020, and whether they kept a distance from their colleagues and regions they live.

Source: Belot et al.'s (2020) data and author's estimations.

Table OA3: Individual Happiness during the COVID-19 Pandemic (Korean Sample, Marginal Effects)

	(1) Extremely Unhappy	(2) Moderately Unhappy	(3) Slightly Unhappy	(4) Neither Happy nor Unhappy	(5) Slightly Happy	(6) Moderately Happy	(7) Extremely Happy
Negative nonfinancial effects	0.078***	0.095***	0.087***	−0.104***	−0.058***	−0.077***	−0.021***
	[0.013]	[0.015]	[0.013]	[0.017]	[0.010]	[0.013]	[0.006]
Positive nonfinancial effects	−0.031**	−0.038***	−0.035***	0.042**	0.023**	0.031**	0.008**
	[0.012]	[0.015]	[0.013]	[0.016]	[0.009]	[0.012]	[0.004]
Job loss							
Temporary job lost	−0.151***	−0.105***	−0.025*	0.190***	0.043***	0.041***	0.007**
	[0.052]	[0.024]	[0.014]	[0.051]	[0.010]	[0.009]	[0.003]
No job lost	−0.169***	−0.127***	−0.046***	0.216***	0.056***	0.058***	0.011***
	[0.053]	[0.024]	[0.013]	[0.051]	[0.009]	[0.009]	[0.003]
Experienced a fall in household income	0.035***	0.042***	0.039***	−0.046***	−0.026***	−0.034***	−0.009***
	[0.009]	[0.010]	[0.009]	[0.011]	[0.007]	[0.009]	[0.003]
Agreement with the current government's approach							
Somewhat disagree	−0.101**	−0.064**	−0.007	0.124**	0.024**	0.021**	0.003*
	[0.045]	[0.025]	[0.011]	[0.050]	[0.010]	[0.009]	[0.002]
Neither agree nor disagree	−0.140***	−0.106***	−0.034***	0.183***	0.045***	0.044***	0.008***
	[0.042]	[0.022]	[0.011]	[0.044]	[0.009]	[0.009]	[0.003]
Somewhat agree	−0.160***	−0.136***	−0.064***	0.213***	0.064***	0.069***	0.015***
	[0.042]	[0.024]	[0.013]	[0.044]	[0.010]	[0.011]	[0.005]
Strongly agree	−0.152***	−0.124***	−0.051***	0.202***	0.055***	0.058***	0.012***
	[0.042]	[0.023]	[0.012]	[0.044]	[0.010]	[0.010]	[0.004]
Effectiveness of measures (aggregate, z–score)	−0.001	−0.001	−0.001	0.001	0.001	0.001	0.000
	[0.004]	[0.005]	[0.005]	[0.006]	[0.003]	[0.004]	[0.001]
Belief							
Fraction of infected people	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of being infected	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of infected people with no symptoms	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of serious illness without requiring hospitalization	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of a serious illness that requires hospitalization	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability that infected people would die	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Male	0.018**	0.022**	0.020**	−0.024**	−0.013**	−0.018**	−0.005**
	[0.008]	[0.009]	[0.008]	[0.010]	[0.006]	[0.008]	[0.002]
Income groups							
Second quintile	−0.001	−0.001	−0.001	0.001	0.000	0.001	0.000
	[0.013]	[0.015]	[0.012]	[0.019]	[0.009]	[0.011]	[0.003]
Third quintile	−0.015	−0.018	−0.016	0.021	0.011	0.014	0.004
	[0.012]	[0.015]	[0.013]	[0.017]	[0.009]	[0.011]	[0.003]
Fourth quintile	−0.015	−0.018	−0.016	0.020	0.011	0.014	0.004
	[0.013]	[0.015]	[0.013]	[0.017]	[0.009]	[0.011]	[0.003]
Fifth quintile	−0.014	−0.017	−0.015	0.020	0.010	0.013	0.004
	[0.013]	[0.016]	[0.014]	[0.018]	[0.010]	[0.012]	[0.003]
Preferred not to say	−0.026	−0.033	−0.031	0.034*	0.021	0.028	0.008
	[0.016]	[0.022]	[0.023]	[0.019]	[0.015]	[0.021]	[0.007]
Number of observations				963			

Note: See note to Table OA2.

Source: Belot et al.'s (2020) data and author's estimations.

Table OA4: Individual Happiness during the COVID-19 Pandemic (Japanese Sample, Marginal Effects)

	(1) Extremely Unhappy	(2) Moderately Unhappy	(3) Slightly Unhappy	(4) Neither Happy nor Unhappy	(5) Slightly Happy	(6) Moderately Happy	(7) Extremely Happy
Negative nonfinancial effects	0.045***	0.045***	0.054***	−0.026***	−0.058***	−0.046***	−0.014***
	[0.010]	[0.009]	[0.011]	[0.007]	[0.011]	[0.010]	[0.004]
Positive nonfinancial effects	−0.020**	−0.020**	−0.024**	0.012**	0.026**	0.020**	0.006**
	[0.008]	[0.008]	[0.010]	[0.005]	[0.010]	[0.008]	[0.003]
Job loss							
Temporary job lost	−0.022	−0.019	−0.019	0.019	0.023	0.015	0.004
	[0.030]	[0.024]	[0.022]	[0.027]	[0.027]	[0.018]	[0.005]
No job lost	−0.033	−0.030	−0.032	0.026	0.036	0.026	0.007*
	[0.028]	[0.023]	[0.020]	[0.026]	[0.025]	[0.016]	[0.004]
Experienced a fall in household income	0.017**	0.017**	0.020**	−0.010**	−0.022**	−0.017**	−0.005*
	[0.008]	[0.008]	[0.010]	[0.005]	[0.010]	[0.008]	[0.003]
Agreement with the current government's approach							
Somewhat disagree	−0.054**	−0.043***	−0.035***	0.053**	0.046***	0.027***	0.006**
	[0.021]	[0.016]	[0.012]	[0.021]	[0.016]	[0.010]	[0.003]
Neither agree nor disagree	−0.070***	−0.059***	−0.055***	0.064***	0.067***	0.043***	0.011***
	[0.020]	[0.015]	[0.011]	[0.020]	[0.014]	[0.009]	[0.003]
Somewhat agree	−0.078***	−0.068***	−0.067***	0.067***	0.079***	0.053***	0.014***
	[0.020]	[0.016]	[0.014]	[0.020]	[0.016]	[0.012]	[0.004]
Strongly agree	−0.093***	−0.089***	−0.100***	0.063***	0.110***	0.084***	0.025**
	[0.022]	[0.020]	[0.027]	[0.022]	[0.026]	[0.027]	[0.011]
Effectiveness of measures (aggregate, z-score)	−0.005	−0.005	−0.005	0.003	0.006	0.005	0.001
	[0.003]	[0.003]	[0.004]	[0.002]	[0.004]	[0.003]	[0.001]
Belief							
Fraction of infected people	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of being infected	0.001***	0.001***	0.001***	−0.000**	−0.001***	−0.001***	−0.000**
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of infected people with no symptoms	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of serious illness without requiring hospitalization	−0.000*	−0.000*	−0.000*	0.000*	0.000*	0.000*	0.000*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of a serious illness that requires hospitalization	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability that infected people would die	0.001***	0.001***	0.001***	−0.000***	−0.001***	−0.001***	−0.000***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Male	0.033***	0.033***	0.040***	−0.019***	−0.042***	−0.033***	−0.010***
	[0.008]	[0.008]	[0.009]	[0.006]	[0.010]	[0.008]	[0.003]
Income groups							
Second quintile	0.005	0.005	0.006	−0.003	−0.007	−0.005	−0.002
	[0.011]	[0.011]	[0.013]	[0.007]	[0.014]	[0.011]	[0.003]
Third quintile	0.007	0.007	0.008	−0.005	−0.009	−0.007	−0.002
	[0.011]	[0.011]	[0.013]	[0.008]	[0.014]	[0.011]	[0.003]
Fourth quintile	−0.009	−0.010	−0.012	0.004	0.013	0.011	0.003
	[0.011]	[0.012]	[0.015]	[0.005]	[0.015]	[0.013]	[0.004]
Fifth quintile	−0.005	−0.006	−0.007	0.003	0.007	0.006	0.002
	[0.012]	[0.012]	[0.015]	[0.006]	[0.016]	[0.013]	[0.004]
Preferred not to say	0.006	0.006	0.007	−0.004	−0.007	−0.006	−0.002
	[0.023]	[0.022]	[0.025]	[0.016]	[0.028]	[0.021]	[0.006]
Number of observations				1,013			

Note: See note to Table OA2.

Source: Belot et al.'s (2020) data and author's estimations.

Table OA5: Individual Happiness during the COVID-19 Pandemic
(Italian Sample, Marginal Effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Extremely Unhappy	Moderately Unhappy	Slightly Unhappy	Neither Happy nor Unhappy	Slightly Happy	Moderately Happy	Extremely Happy
Negative nonfinancial effects	0.142***	0.110***	0.049***	−0.111***	−0.060***	−0.102***	−0.027***
	[0.018]	[0.013]	[0.007]	[0.015]	[0.008]	[0.013]	[0.007]
Positive nonfinancial effects	−0.077***	−0.060***	−0.027***	0.061***	0.033***	0.056***	0.015**
	[0.026]	[0.020]	[0.009]	[0.021]	[0.012]	[0.019]	[0.006]
Job loss							
Temporary job lost	−0.059**	−0.038**	−0.012***	0.049**	0.021**	0.032**	0.007**
	[0.028]	[0.016]	[0.004]	[0.023]	[0.009]	[0.013]	[0.003]
No job lost	−0.061**	−0.040**	−0.013***	0.050**	0.022**	0.034***	0.008**
	[0.029]	[0.016]	[0.004]	[0.024]	[0.009]	[0.013]	[0.003]
Experienced a fall in household income	0.042***	0.032***	0.014***	−0.033***	−0.018***	−0.030***	−0.008***
	[0.013]	[0.010]	[0.005]	[0.010]	[0.006]	[0.010]	[0.003]
Agreement with the current government's approach							
Somewhat disagree	−0.085**	−0.041**	−0.002	0.070**	0.023**	0.030**	0.006*
	[0.038]	[0.017]	[0.005]	[0.031]	[0.010]	[0.013]	[0.003]
Neither agree nor disagree	−0.119***	−0.066***	−0.012	0.098***	0.036***	0.051***	0.011**
	[0.037]	[0.018]	[0.008]	[0.029]	[0.010]	[0.015]	[0.004]
Somewhat agree	−0.113***	−0.061***	−0.010**	0.094***	0.033***	0.047***	0.009***
	[0.035]	[0.015]	[0.005]	[0.028]	[0.009]	[0.011]	[0.003]
Strongly agree	−0.139***	−0.085***	−0.023***	0.115***	0.047***	0.070***	0.016***
	[0.036]	[0.017]	[0.007]	[0.028]	[0.010]	[0.014]	[0.004]
Effectiveness of measures (aggregate, z-score)	−0.009	−0.007	−0.003	0.007	0.004	0.006	0.002
	[0.007]	[0.005]	[0.002]	[0.006]	[0.003]	[0.005]	[0.001]
Belief							
Fraction of infected people	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of being infected	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of infected people with no symptoms	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of serious illness without requiring hospitalization	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of a serious illness that requires hospitalization	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability that infected people would die	0.001**	0.000**	0.000**	−0.000**	−0.000**	−0.000**	−0.000**
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Male	−0.015	−0.012	−0.005	0.012	0.006	0.011	0.003
	[0.011]	[0.009]	[0.004]	[0.009]	[0.005]	[0.008]	[0.002]
Income groups							
Second quintile	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.020]	[0.015]	[0.007]	[0.016]	[0.008]	[0.014]	[0.004]
Third quintile	−0.001	−0.001	−0.000	0.001	0.001	0.001	0.000
	[0.019]	[0.015]	[0.007]	[0.015]	[0.008]	[0.014]	[0.004]
Fourth quintile	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.019]	[0.015]	[0.007]	[0.015]	[0.008]	[0.014]	[0.004]
Fifth quintile	−0.008	−0.006	−0.003	0.006	0.003	0.006	0.002
	[0.021]	[0.017]	[0.008]	[0.017]	[0.009]	[0.016]	[0.004]
Preferred not to say	0.079	0.046*	0.011**	−0.064	−0.025*	−0.038*	−0.009*
	[0.058]	[0.027]	[0.005]	[0.046]	[0.015]	[0.021]	[0.005]
Number of observations				1,044			

Note: See note to Table OA2.

Source: Belot et al.'s (2020) data and author's estimations.

Table OA6: Individual Happiness during the COVID-19 Pandemic
(British Sample, Marginal Effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Neither			
	Extremely Unhappy	Moderately Unhappy	Slightly Unhappy	Happy nor Unhappy	Slightly Happy	Moderately Happy	Extremely Happy
Negative nonfinancial effects	0.109***	0.110***	0.085***	−0.002	−0.071***	−0.176***	−0.056***
	[0.014]	[0.013]	[0.009]	[0.006]	[0.009]	[0.016]	[0.009]
Positive nonfinancial effects	−0.057***	−0.058***	−0.045***	0.001	0.037***	0.093***	0.029***
	[0.012]	[0.012]	[0.009]	[0.003]	[0.008]	[0.019]	[0.007]
Job loss							
Temporary job lost	0.001	0.001	0.000	−0.000	−0.000	−0.001	−0.000
	[0.021]	[0.020]	[0.014]	[0.003]	[0.014]	[0.030]	[0.008]
No job lost	−0.016	−0.016	−0.012	0.001	0.011	0.026	0.008
	[0.021]	[0.020]	[0.014]	[0.003]	[0.013]	[0.030]	[0.008]
Experienced a fall in household income	0.017*	0.017*	0.013*	−0.000	−0.011*	−0.027*	−0.009*
	[0.009]	[0.010]	[0.007]	[0.001]	[0.006]	[0.015]	[0.005]
Agreement with the current government's approach							
Somewhat disagree	−0.142**	−0.054***	0.008	0.064***	0.054***	0.062***	0.008**
	[0.055]	[0.018]	[0.011]	[0.024]	[0.019]	[0.021]	[0.003]
Neither agree nor disagree	−0.196***	−0.097***	−0.013	0.083***	0.087***	0.116***	0.019***
	[0.052]	[0.018]	[0.013]	[0.023]	[0.017]	[0.022]	[0.005]
Somewhat agree	−0.218***	−0.121***	−0.031**	0.085***	0.103***	0.152***	0.029***
	[0.051]	[0.017]	[0.012]	[0.023]	[0.017]	[0.018]	[0.005]
Strongly agree	−0.232***	−0.140***	−0.049***	0.081***	0.114***	0.185***	0.040***
	[0.051]	[0.018]	[0.014]	[0.023]	[0.017]	[0.021]	[0.007]
Effectiveness of measures (aggregate, z-score)	−0.004	−0.004	−0.003	0.000	0.003	0.007	0.002
	[0.004]	[0.004]	[0.003]	[0.000]	[0.003]	[0.007]	[0.002]
Belief							
Fraction of infected people	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of being infected	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of infected people with no symptoms	−0.000*	−0.000*	−0.000*	0.000	0.000*	0.001*	0.000*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of serious illness without requiring hospitalization	−0.000	−0.000	−0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of a serious illness that requires hospitalization	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability that infected people would die	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Male	−0.013	−0.013	−0.010	0.000	0.009	0.021	0.007
	[0.008]	[0.008]	[0.006]	[0.001]	[0.005]	[0.013]	[0.004]
Income groups							
Second quintile	−0.022	−0.022	−0.016	0.001	0.014	0.034	0.010
	[0.014]	[0.014]	[0.010]	[0.002]	[0.009]	[0.021]	[0.006]
Third quintile	−0.018	−0.017	−0.013	0.002	0.012	0.027	0.008
	[0.014]	[0.014]	[0.010]	[0.002]	[0.009]	[0.021]	[0.006]
Fourth quintile	−0.027*	−0.028**	−0.021**	0.001	0.018*	0.044**	0.014**
	[0.014]	[0.014]	[0.011]	[0.002]	[0.009]	[0.022]	[0.007]
Fifth quintile	−0.012	−0.011	−0.008	0.001	0.008	0.017	0.005
	[0.015]	[0.015]	[0.010]	[0.002]	[0.010]	[0.022]	[0.006]
Preferred not to say	0.057	0.041	0.020**	−0.018	−0.032	−0.055	−0.013*
	[0.046]	[0.028]	[0.010]	[0.018]	[0.023]	[0.036]	[0.008]
Number of observations				1,015			

Note: See note to Table OA2.

Source: Belot et al.'s (2020) data and author's estimations.

Table OA7: Individual Happiness during the COVID-19 Pandemic
(American Sample, Marginal Effects)

	(1) Extremely Unhappy	(2) Moderately Unhappy	(3) Slightly Unhappy	(4) Neither Happy nor Unhappy	(5) Slightly Happy	(6) Moderately Happy	(7) Extremely Happy
Negative nonfinancial effects	0.086***	0.091***	0.059***	0.009*	−0.038***	−0.130***	−0.077***
	[0.013]	[0.013]	[0.008]	[0.005]	[0.006]	[0.016]	[0.012]
Positive nonfinancial effects	−0.036***	−0.038***	−0.024***	−0.004	0.016***	0.054***	0.032***
	[0.012]	[0.012]	[0.008]	[0.002]	[0.005]	[0.017]	[0.011]
Job loss							
Temporary job lost	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.019]	[0.019]	[0.011]	[0.001]	[0.009]	[0.026]	[0.014]
No job lost	−0.016	−0.016	−0.010	−0.001	0.007	0.023	0.013
	[0.019]	[0.019]	[0.011]	[0.001]	[0.009]	[0.026]	[0.014]
Experienced a fall in household income	0.024**	0.025**	0.016**	0.002	−0.011**	−0.036**	−0.021**
	[0.010]	[0.010]	[0.007]	[0.002]	[0.004]	[0.014]	[0.009]
Agreement with the current government's approach							
Somewhat disagree	0.046	0.033	0.012	−0.015	−0.020	−0.041	−0.015
	[0.031]	[0.022]	[0.009]	[0.010]	[0.013]	[0.028]	[0.011]
Neither agree nor disagree	−0.032	−0.031	−0.018	0.003	0.015	0.042	0.020
	[0.023]	[0.021]	[0.011]	[0.005]	[0.011]	[0.027]	[0.013]
Somewhat agree	−0.035*	−0.034*	−0.019**	0.003	0.017*	0.046*	0.022**
	[0.021]	[0.018]	[0.009]	[0.005]	[0.010]	[0.024]	[0.011]
Strongly agree	−0.053**	−0.056***	−0.036***	−0.003	0.025**	0.079***	0.043***
	[0.021]	[0.019]	[0.010]	[0.006]	[0.010]	[0.025]	[0.012]
Effectiveness of measures (aggregate, z-score)	0.002	0.002	0.001	0.000	−0.001	−0.003	−0.002
	[0.004]	[0.004]	[0.003]	[0.000]	[0.002]	[0.006]	[0.004]
Belief							
Fraction of infected people	−0.000	−0.000	−0.000	−0.000	0.000	0.001	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of being infected	0.000	0.000	0.000	0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of infected people with no symptoms	0.000	0.000	0.000	0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of serious illness without requiring hospitalization	−0.000	−0.000	−0.000	−0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability of a serious illness that requires hospitalization	−0.000	−0.000	−0.000	−0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Probability that infected people would die	0.000	0.000	0.000	0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Male	−0.002	−0.002	−0.002	−0.000	0.001	0.004	0.002
	[0.009]	[0.009]	[0.006]	[0.001]	[0.004]	[0.013]	[0.008]
Income groups							
Second quintile	−0.032*	−0.030**	−0.016**	0.003	0.015*	0.040**	0.020**
	[0.017]	[0.015]	[0.008]	[0.003]	[0.008]	[0.020]	[0.010]
Third quintile	−0.043***	−0.041***	−0.024***	0.002	0.019***	0.057***	0.030***
	[0.016]	[0.015]	[0.009]	[0.004]	[0.007]	[0.020]	[0.011]
Fourth quintile	−0.042**	−0.041***	−0.023***	0.002	0.019**	0.056***	0.029***
	[0.017]	[0.015]	[0.009]	[0.004]	[0.008]	[0.021]	[0.011]
Fifth quintile	−0.048***	−0.047***	−0.028***	0.001	0.022***	0.066***	0.036***
	[0.018]	[0.017]	[0.010]	[0.004]	[0.008]	[0.024]	[0.013]
Preferred not to say	−0.021	−0.019	−0.010	0.003	0.010	0.025	0.012
	[0.040]	[0.038]	[0.021]	[0.004]	[0.018]	[0.051]	[0.026]
Number of observations				1,054			

Note: See note to Table OA2.

Source: Belot et al.'s (2020) data and author's estimations.