

Long Social Distancing

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Overview of Main Findings, 1

1. Many working-age Americans plan (as of 2022) to continue some forms of social distancing after the pandemic ends.
2. Social distancing intentions are stronger among older persons, the less educated, those who live with or care for persons at high risk from infectious diseases, and those who work in occupations and industries that require many face-to-face encounters.
3. Regression models fit to individual-level data suggest that social distancing lowered labor force participation by 2.4 pts in 2022, 1.2 points on an earnings-weighted basis.
 - These social-distancing effects on participation are highly concentrated among those with Long-COVID experience and daily contact with persons at high risk from infectious diseases.

Overview of Main Findings, 2

4. When combined with simple equilibrium models, our results imply:
 - A. The participation drag reduced U.S. output by \$205 billion in 2022.
 - B. The uneven nature of the participation drag raised the relative supply of college-educated workers and shrank the college wage premium by 2.1 ppts.
 - C. It also modestly steepened the cross-sectional age-wage profile, more so for less educated workers.
5. The S-D drag on participation fell by an estimated 1.6 ppts from February 2022 to April 2023, generating a sizable upward impulse to potential employment and output.
6. Drawing on self-assessed causal effects in a separate analysis, infection worries lowered participation by an estimated one percentage point as of late 2022.
 - This estimated drag on participation fell 1.3 ppts from Feb. 2022 to April 2023.

Survey of Working Arrangements and Attitudes

- Monthly online survey since May 2020, >150,000 observations to date.
- We design the survey instrument.
- Target population: **U.S. residents, 20-64** (subject to a minimum prior-year earnings requirement prior to the May 2023 wave)
- The SWAA is fielded by market research firms that rely on wholesale aggregators (e.g., [Lucid](#)) to tap pre-recruited panels of survey participants.
- After dropping “speeders” (~16% of sample), we re-weight to match 2010-2019 CPS worker shares in age-sex-education-earnings cells.
- Median response time: 7 to 12 minutes, after dropping speeders.
- Core analyses in this paper also drop persons who fail one or more of three attention check questions (~12% of sample)
- Survey instruments and micro data at www.WFHresearch.com. See “Why Working from Home Will Stick” by BBD for more information on the SWAA.

Sample Selection and Representativeness

- No respondents are recruited based on an interest in our topics.
- Since respondents take the survey using a computer, smartphone, iPad or like device, we miss people who never use such devices.
- Before re-weighting, the SWAA under samples the less educated, particularly those who did not finish high school.
- Even after re-weighting, we may over sample those who are more tech and internet savvy, especially among the least educated.
- We compare SWAA and HPS responses to a question about the “main reason for not working for pay or profit” to assess non-random selection on unobservables.

Table A.1. Comparison of SWAA and HPS Responses to the HPS Question about the Main Reason for Not Working

What is your main reason for not working for pay or profit?

	Household Pulse Survey	Survey of Working Arrangements and Attitudes	
	29 Jun. – 11 Jul., 27 Jul. – 8 Aug., 14 – 18 Sep., 2022	12 – 25 Jul., 11 – 18 Aug. , 13 – 24 Sep. 2022	
	Percent of respondents	Respondents who pass attention check questions	All respondents
		Percent	
I was concerned about getting or spreading the coronavirus	1.9 (0.1)	2.6 (0.4)	2.5 (0.4)
I am/was sick with coronavirus symptoms or caring for someone who was sick with coronavirus symptoms	3.2 (0.2)	1.6 (0.3)	1.4 (0.3)
Observations	12,532	1,539	1,850

Notes: This table shows selected responses to the stated question in the Household Pulse Survey (HPS) and in the SWAA for similar sample periods. The response options are 1) I did not want to be employed at this time; 2) I am/was sick with coronavirus symptoms or caring for someone who was sick with coronavirus symptoms; 3) I am/was caring for children not in school or daycare; 4) I am/was caring for an elderly person; 5) I was concerned about getting or spreading the coronavirus; 6) I am/was sick (not coronavirus related) or disabled; 7) I am retired; 8) I am/was laid off or furloughed due to coronavirus pandemic; 9) My employer closed temporarily due to the coronavirus pandemic; 10) My employer went out of business due to the coronavirus pandemic; 11) I do/did not have transportation to work; 12) Other reason, please specify. In the SWAA, we combine options 9 and 10 into a single option saying "My employer went out of business due to the coronavirus pandemic" and we reclassify responses of "Other reason" depending on the description provided. The SWAA sample restricts attention to people who report not working and not seeking work. For the HPS, we drop persons with household income per adult below \$25,000 (for 1-person households) or \$17,500 (for 2- or 3-adult households). The SWAA sample excludes persons who earned less than \$10,000 in 2021. We drop persons who applied for or received unemployment benefits in 2022, and those who report job loss in the household during the four weeks before the survey.

SWAA Question about Social Distancing Intentions

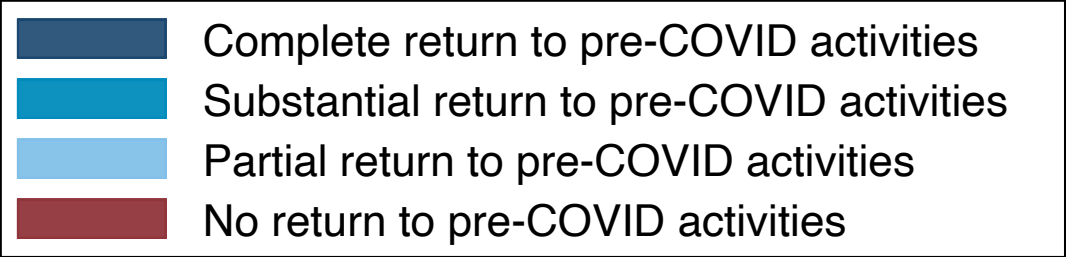
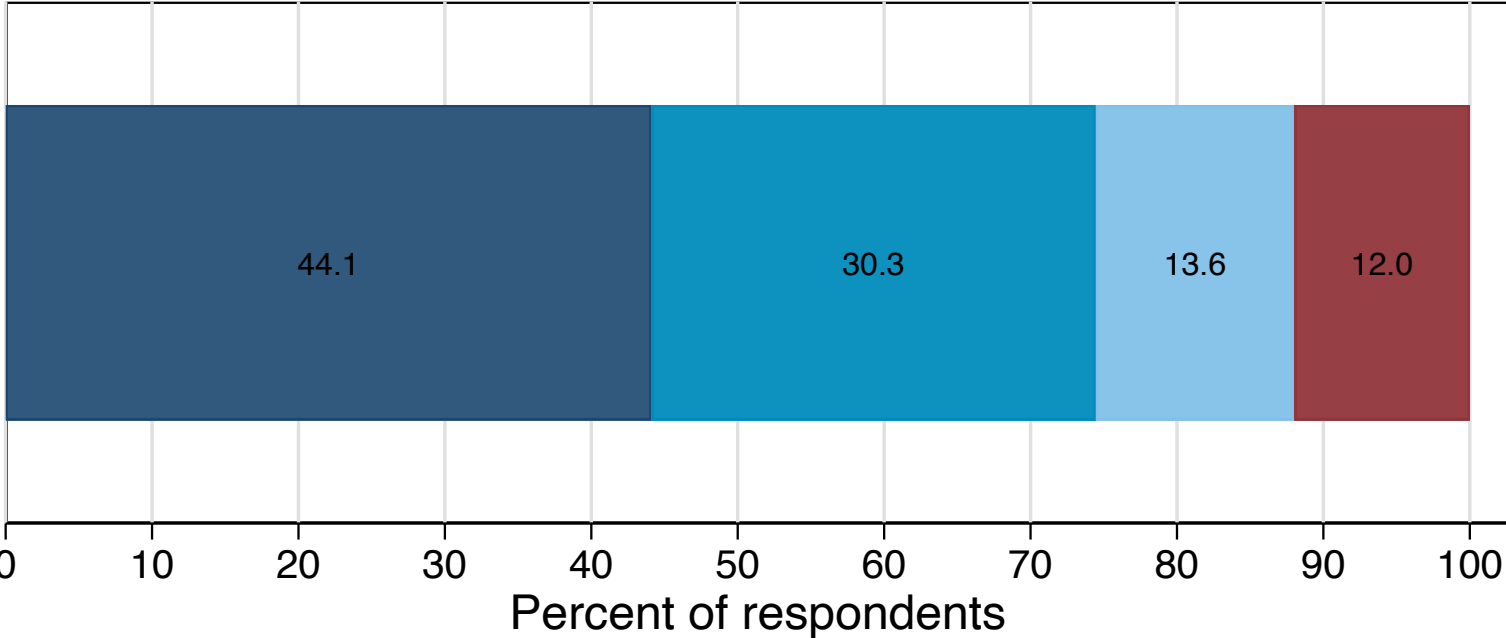
Once the COVID-19 pandemic has ended, which of the following would best fit your views on social distancing?

- Complete return to pre-COVID activities
- Substantial return to pre-COVID activities, but I would still be wary of things like riding the subway or getting into a crowded elevator
- Partial return to pre-COVID activities, but I would be wary of many activities like eating out or using ride-share taxis
- No return to pre-COVID activities, as I will continue to social distance

Continue

Figure 1. Social Distancing Intentions, February 2022 to January 2023

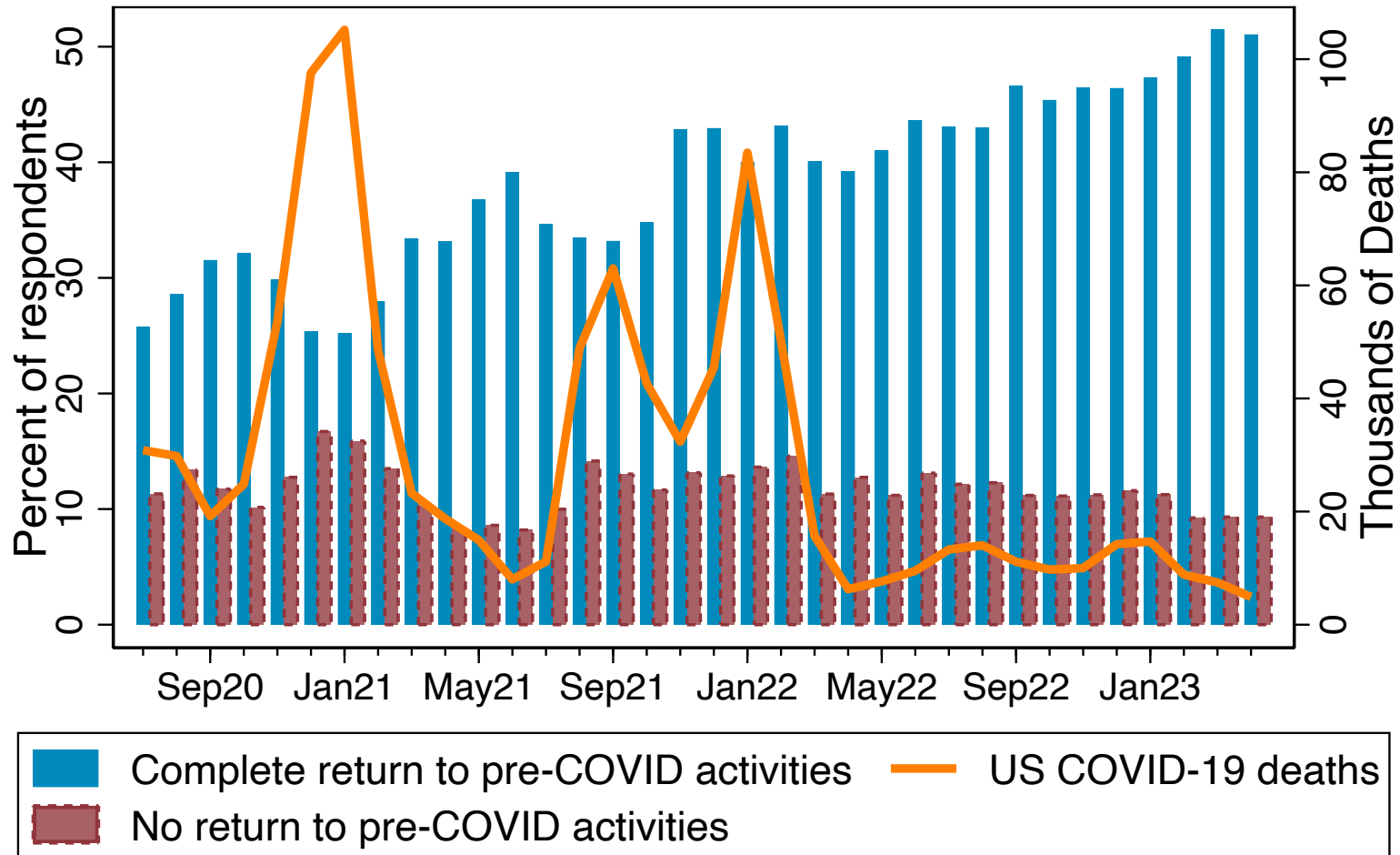
As the COVID-19 pandemic ends, which of the following would best fit your views on social distancing?



Notes: The chart title states the survey question as fielded from July 2022 onwards. From February to June 2022, the question differs slightly and reads as follows: “*Once the COVID-19 pandemic has ended,...*”. The tabulations reflect SWAA samples of US residents, 20 to 64, with prior-year earnings of at least \$10,000 or, for one-half of respondents in February 2022 and one-quarter in March 2022, earnings of at least \$10,000 in 2019. N = 62,751.

Figure 2. Social Distancing Intentions and COVID Deaths, July 2020 to April 2023

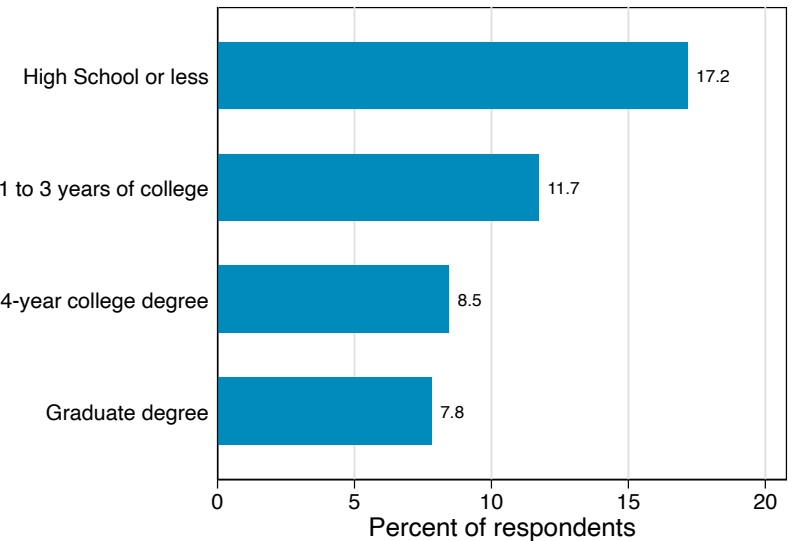
As the COVID-19 pandemic ends, which of the following would best fit your views on social distancing?



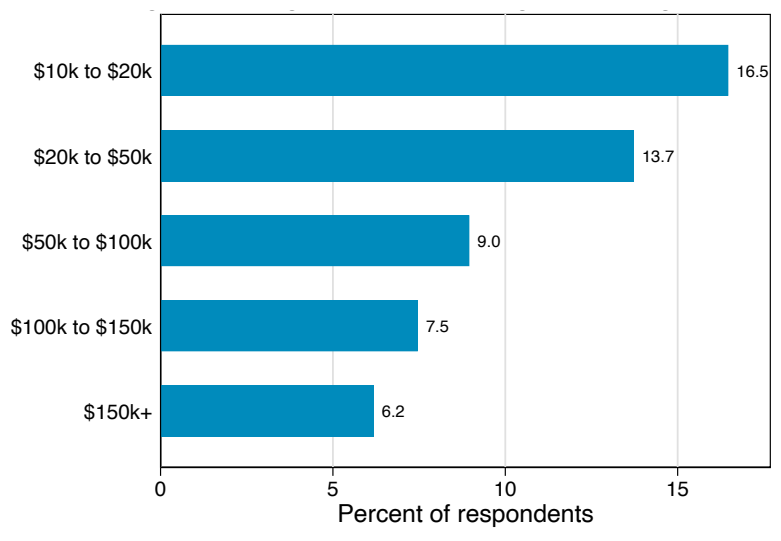
Notes: The chart title states the survey question as fielded from July 2022 onwards. The opening clause differs in earlier waves as follows: “If a COVID vaccine is discovered and made widely available” (July-November 2020); “If a COVID vaccine is approved and made widely available” (December 2020); “If a COVID vaccine becomes widely available” (January- February 2021); “Once *most of the population has been vaccinated* against COVID” (March-September 2021); and “*Once the COVID-19 pandemic has ended*” (October 2021 to June 2022). The SWAA samples used in this chart cover US residents, aged 20 to 64, who meet a prior earnings requirement, as described in the text. N = 148,548 for SWAA data. The data on US COVID-19 deaths are from the US Centers for Disease Control (CDC).

Figure 3. Strong-Form Social Distancing Falls with Education and Earnings, and It Rises with Age

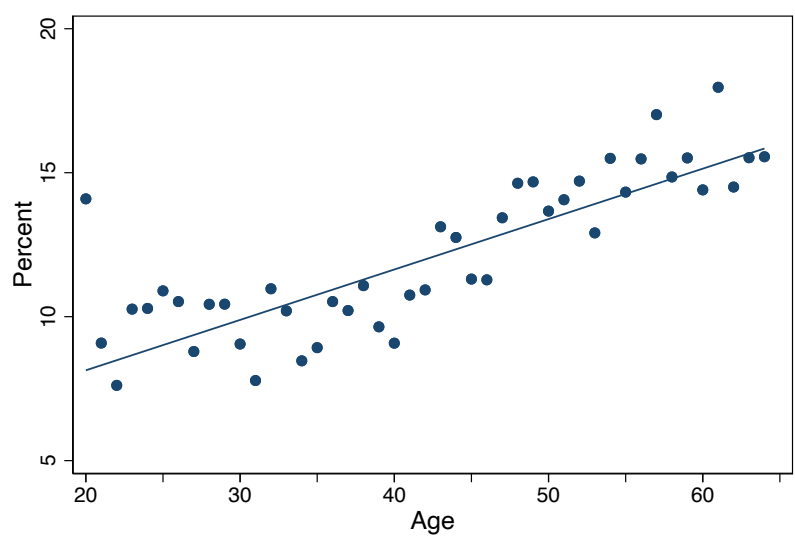
A. By Education



B. By Earnings

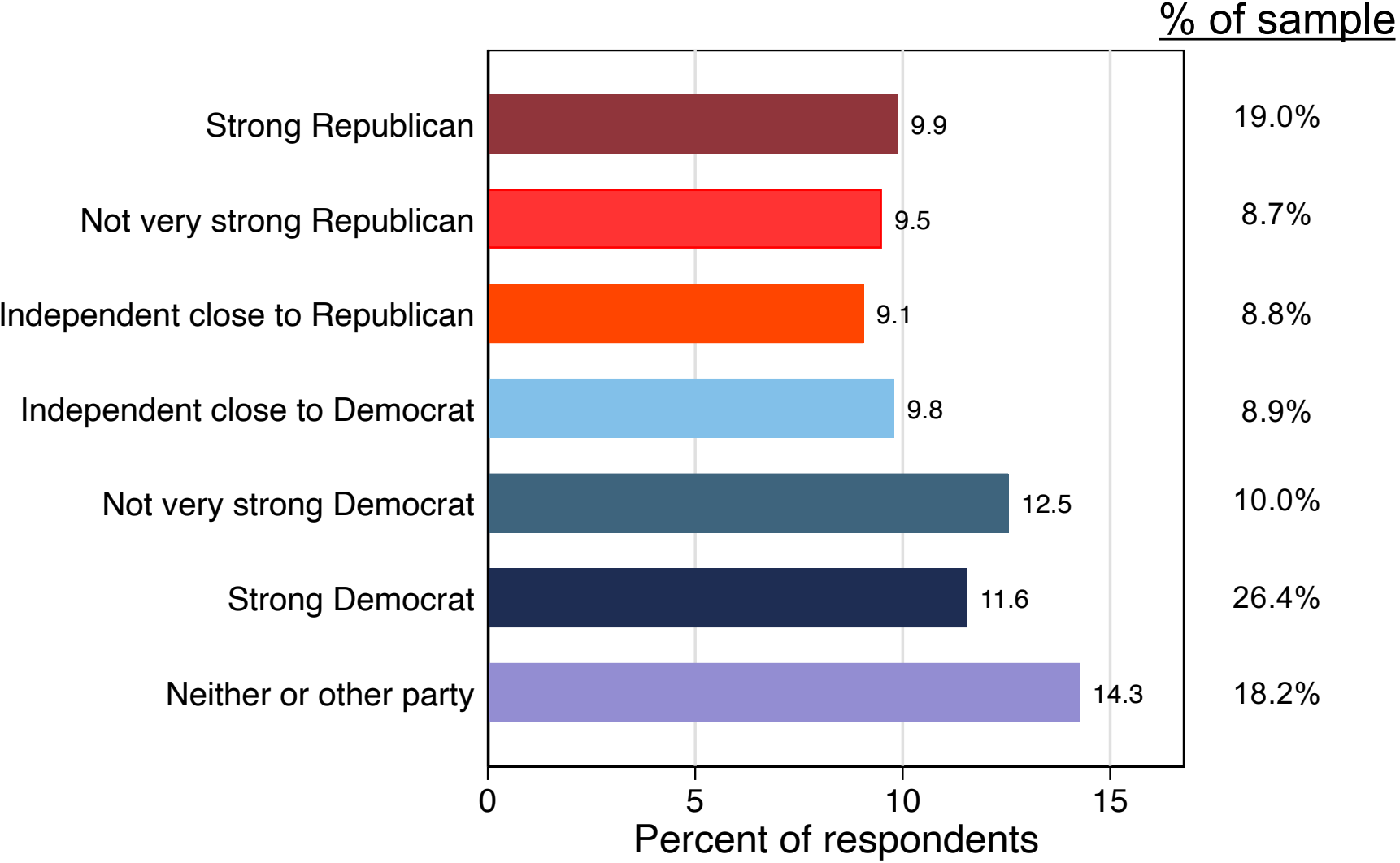


C. By Age (One-year bins)



Notes: These charts make use of SWAA data from February 2022 to January 2023 and cover US residents, 20 to 64, who satisfy the prior-year earnings requirement described in the notes to Figure 1. The sample is also the same as in Figure 1. See Figure A.4 for a breakdown by sex and age and Figure A.5 for a more granular set of earnings bins. N = 62,751.

Figure 4. Strong-Form Social Distancing by Partisan Affiliation



Notes: This chart make use of SWAA data from February 2022 to January 2023. The sample is the same as in Figures 1 and 3, except for excluding respondents who prefer not to answer. N = 60,544.

Table 1. How Social Distancing Intentions Relate to COVID Experiences and Living with or Caring for Vulnerable Persons

Dependent variable: Index of Return to Pre-COVID Activities (100 = full return, 66.7 = substantial return, 33.3 = partial return, 0 = no return)					
	(1)	(2)	(3)	(4)	(5)
1(Had COVID)	5.0*** (0.7)	5.8*** (0.8)			6.4*** (0.8)
1(Had Long COVID)		-2.8** (1.1)			-0.8 (1.2)
1(Close Friends/Family Had Long COVID)			-2.0** (0.8)		-2.3*** (0.9)
1(Live/Care for Someone Vulnerable)				-4.0*** (0.8)	-4.5*** (0.9)
Constant	66.7*** (0.5)	66.7*** (0.5)	69.6*** (0.5)	70.2*** (0.5)	68.1*** (0.6)
Observations	21,695	21,695	21,695	21,695	21,695
R-squared	0.01	0.01	0.00	0.00	0.01

Notes: We construct individual-level values for the Return Index using our question about social distancing intentions. See Figure 1 for a statement of the question and the response options. The mean value of the Return Index is 69.0 and the standard deviation is 34.7. We set “Had COVID” to 1 if the respondent says yes to "Have you had a positive diagnosis for COVID-19?" or "Despite not having tested positive for COVID-19, do you believe you have been infected at some point?" We set “Had Long COVID” to 1 if the respondent says yes to "Did you have any symptoms lasting 3 months or longer that you did not have prior to having coronavirus or COVID-19?" We use responses to "Have any close friends or family members of yours experienced symptoms lasting 3 months or longer that they did not have prior to a COVID infection?" and “Do you live with or care for someone who would be more vulnerable than the general population to COVID-19 or other infectious diseases?” in the same way. The sample period runs from October 2022 to January 2023. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Quantifying the Effect of Social Distancing and Infection Worries on LF Status

We use two distinct methods to quantify the effects of social distancing and infection worries on labor force participation:

1. Regression models that relate labor force status to individual-level social distancing intentions.
 - Identifying assumption: Social distancing intentions are exogenous w.r.t. participation, conditional on controls.
2. Self-assessed reasons for non-participation.
 - Identifying assumption: Respondents accurately report reasons for own behavior.

Table 2. Our Regression Approach to Quantifying the Effects of Social Distancing Intentions on Labor Force Participation

Question: Once the COVID-19 pandemic has ended, which of the following would best fit your views on social distancing?

Sample Period: February 2022 to January 2023

Dependent variable: 100 x 1(Not working and not looking for work)

	(1) Regression coefficient	(2) Percent of sample	(3) Implied drag on LF participation rate (ppts)	(4) Implied drag on LF participation rate (ppts), no earnings requirement
Complete return to pre-COVID activities (baseline)	-	44.1	0	0
Substantial return to pre-COVID activities (e.g. avoid subway, crowded elevators)	0.5 (0.4)	30.3	0.1 (0.1)	-0.1 (0.2)
Partial return to pre-COVID activities (e.g. avoid eating out, taxi/ride-share)	3.7 (0.6)	13.6	0.5 (0.1)	0.5 (0.1)
No return to pre-COVID activities	14.4 (0.8)	12.0	1.7 (0.1)	2.3 (0.1)
	Total drag: Equal-Weighted		2.4 (0.2)	2.7 (0.4)
	Earnings-Weighted		1.2 (0.2)	1.4 (0.2)
Observations	62,751		62,751	57,206
R-squared	0.02			

Notes: Column (1) reports regression coefficients on the indicated level of social distancing intentions, and column (2) reports the sample percentage at each level. Column (3) is computed as (1) times (2) divided by 100. Column (4) reports the results of an analogous calculation for a sample with no prior earnings requirement. We use the row entries in columns (3) and (4) to compute the “Total Drag” in an equal-weighted and earnings-weighted manner (using prior-year earnings). We use SWAA data from February 2022 to January 2023 except in column (4), for which the requisite data are not available in March and April 2022. Robust standard errors in parentheses for the regression coefficients. We compute the standard errors in columns (3) and (4) via the Delta method using the joint variance-covariance matrix of the regression coefficients and the percent₁₄ at each social distancing level.

Table 3. Estimated Effects of Social Distancing Intentions on Labor Force Participation by Age and by Education

<i>A. By Age Group</i>	Ages 20 to 29	Ages 30 to 39	Ages 40 to 49	Ages 50 to 64
Substantial return to pre-COVID activities (e.g. avoid subway, crowded elevators)	0.4 (0.8)	-0.3 (0.5)	0.5 (0.7)	3.5*** (1.0)
Partial return to pre-COVID activities (e.g. avoid eating out, taxi/ride-share)	-0.4 (0.9)	1.9*** (0.7)	2.9*** (1.0)	9.4*** (1.4)
No return to pre-COVID activities	2.7** (1.3)	9.4*** (1.4)	13.3*** (1.4)	18.5*** (1.4)
<i>Implied drag on labor force participation rate, percentage points</i>	0.4 (0.4)	1.1 (0.3)	2.1 (0.3)	5.0 (0.5)
<i>B. By Education Group</i>	No college	1 to 3 years of college	4-year college degree	Graduate degree
Substantial return to pre-COVID activities (e.g. avoid subway, crowded elevators)	2.9*** (1.0)	2.3*** (0.8)	-1.3** (0.6)	-0.5 (0.8)
Partial return to pre-COVID activities (e.g. avoid eating out, taxi/ride-share)	6.5*** (1.4)	4.2*** (1.0)	1.1 (0.9)	1.7 (1.3)
No return to pre-COVID activities	17.1*** (1.4)	12.3*** (1.2)	8.3*** (1.4)	10.2*** (2.1)
<i>Implied drag on labor force participation rate, percentage points</i>	4.5 (0.5)	2.7 (0.4)	0.4 (0.3)	0.8 (0.5)

Notes: For each indicated age and education category, we regress $100 \times 1(\text{Not working and not looking for work})$ on responses to "Once the COVID-19 pandemic has ended, which of the following would best fit your views on social distancing?" The omitted social distancing group is "Complete return to pre-COVID activities." In the "No college" regression, we allow distinct intercepts for did and did not finish high school. Otherwise, the regression specification is the same as in Table 2. So is the sample period, which runs from February 2022 to January 2023. The first three rows in each panel report regression coefficients on the indicated extent of social distancing. The last row reports the implied drag on the labor force participation rate, following the equal-weighted calculations in Table 1. See the notes to Table 1 regarding the calculation of standard errors.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4. Social Distancing Intentions, COVID Experiences, Interactions with Vulnerable Persons, and Labor Force Participation

Dependent Variable	(1)	(2)	(3)	(4)	(5)
	100 x 1(Not working and not looking for work)				
Social distancing impact index (mean = 2.5, standard deviation = 4.7)					
x 1(Had COVID)	1.9*** (0.1)			1.8*** (0.1)	1.4*** (0.2)
x 1(Had Long COVID)					-0.4 (0.3)
x 1(Close Friends/Family Had Long COVID)					1.5*** (0.4)
x 1(Live/Care for Someone Vulnerable)					0.6** (0.3)
1(Had COVID)		-3.3*** (1.0)	-3.2*** (1.1)	-2.1* (1.1)	-1.4 (1.3)
1(Had Long COVID)			-0.4 (1.7)	-2.0 (1.7)	-5.0*** (1.8)
1(Close Friends/Family Had Long COVID)				0.6 (1.2)	-1.1 (1.4)
1(Live/Care for Someone Vulnerable)				4.2*** (1.2)	2.2* (1.4)
Constant	22.3*** (0.6)	28.6*** (0.7)	28.6*** (0.7)	22.2*** (0.8)	23.3*** (0.8)
Observations	21,695	21,695	21,695	21,695	21,695
R-squared	0.04	0.00	0.00	0.04	0.05

Notes: We regress 100 x 1(Not working and not looking for work) on an index for the social-distancing drag on participation and the indicated experiential and situational variables. The sample covers the September to December 2022 waves. It excludes persons who fail any of the attention check questions. We classify a person as having had COVID if they say yes to either of the following questions: "Have you had a positive diagnosis for COVID-19?" "Despite not having tested positive for COVID-19, do you believe you have been infected at some point?" We report robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5. Social Distancing Intentions Exert a Greater Labor Force Drag on Persons More Strongly Impacted by COVID

	(1)	(2)	(2)	(4)	(5)
	Dependent Variable: 100 x 1(Not working and not looking for work)				
	Full sample	No Long COVID experience and No Care of Vulnerable Person	Had Long COVID	Close Friends or Family Had Long COVID	Lives with or Cares for Vulnerable Person
Substantial return to pre-COVID activities (e.g. avoid subway, crowded elevators)	0.3 (1.2)	-4.5*** (1.6)	7.1** (3.0)	4.1* (2.1)	9.3*** (2.2)
Partial return to pre-COVID activities (e.g. avoid eating out, taxi/ride-share)	3.3** (1.6)	-2.9 (2.2)	17.3*** (4.5)	10.9*** (3.0)	9.0*** (2.9)
No return to pre-COVID activities	16.5*** (1.8)	8.8*** (2.3)	34.3*** (5.2)	26.3*** (3.3)	30.1*** (3.3)
Estimated drag on labor force participation rate, percentage points	2.6 (0.6)	-0.3 (0.7)	8.3 (1.5)	6.0 (1.1)	8.2 (1.2)
Observations (Sample Period: September – December 2022)	21,695	11,389	3,423	6,975	6,519
R-squared	0.02	0.01	0.06	0.03	0.04

Notes: This table applies the same regression approach as Table 2. We implement the subsample selections as follows: For column (3), we include persons who respond yes to "Did you have any symptoms lasting 3 months or longer that you did not have prior to having coronavirus or COVID-19?" For column (4), we include persons who respond yes to "Have any close friends or family members of yours experienced symptoms lasting 3 months or longer that they did not have prior to a COVID infection?" For column (5), we include persons who respond yes to "Do you live with or care for someone who would be more vulnerable than the general population to COVID-19 or other infectious diseases?" For column (2), we include persons who respond no to all three questions. The sample covers the period in which we asked these questions and excludes respondents who failed any attention check questions. See Table 2 for explanations of how we calculate the labor force drag estimates and standard errors. *** p<0.01, ** p<0.05, * p<0.1

Infection Worries and Participation, 1

Since October 2022, we put the following question to SWAA respondents who are not working and not seeking work in the survey reference week:

What is the main reason you are *not currently working and not seeking work*?

- a) I am retired
- b) I am a full-time student
- c) I worry about catching COVID or other infectious diseases
- d) I would lose social assistance benefits (e.g. Medicaid, disability payments, food stamps, etc.)
- e) My health makes it hard to work
- f) Child-care responsibilities
- g) Other caregiving responsibilities – e.g., caring for a parent or partner
- h) I don't need to work, and I prefer not to
- i) Other reason (please specify): [Free-form text input]

We randomize the response orderings, except for placing “Other reason” last.

Infection Worries and Participation, 2

We then ask: “What is the second most important reason you are *not currently working and not seeking work*?”

Response options are the same except for dropping the main reason and adding “None” at the end of the response options.

We deliberately frame these question in terms of “catching COVID or other infectious diseases” to allow for the possibility that the pandemic experience increased the salience of all work-related infection risks.

Table 6. Using Self-Assessments to Estimate the Labor Force Drag Due to Infection Worries

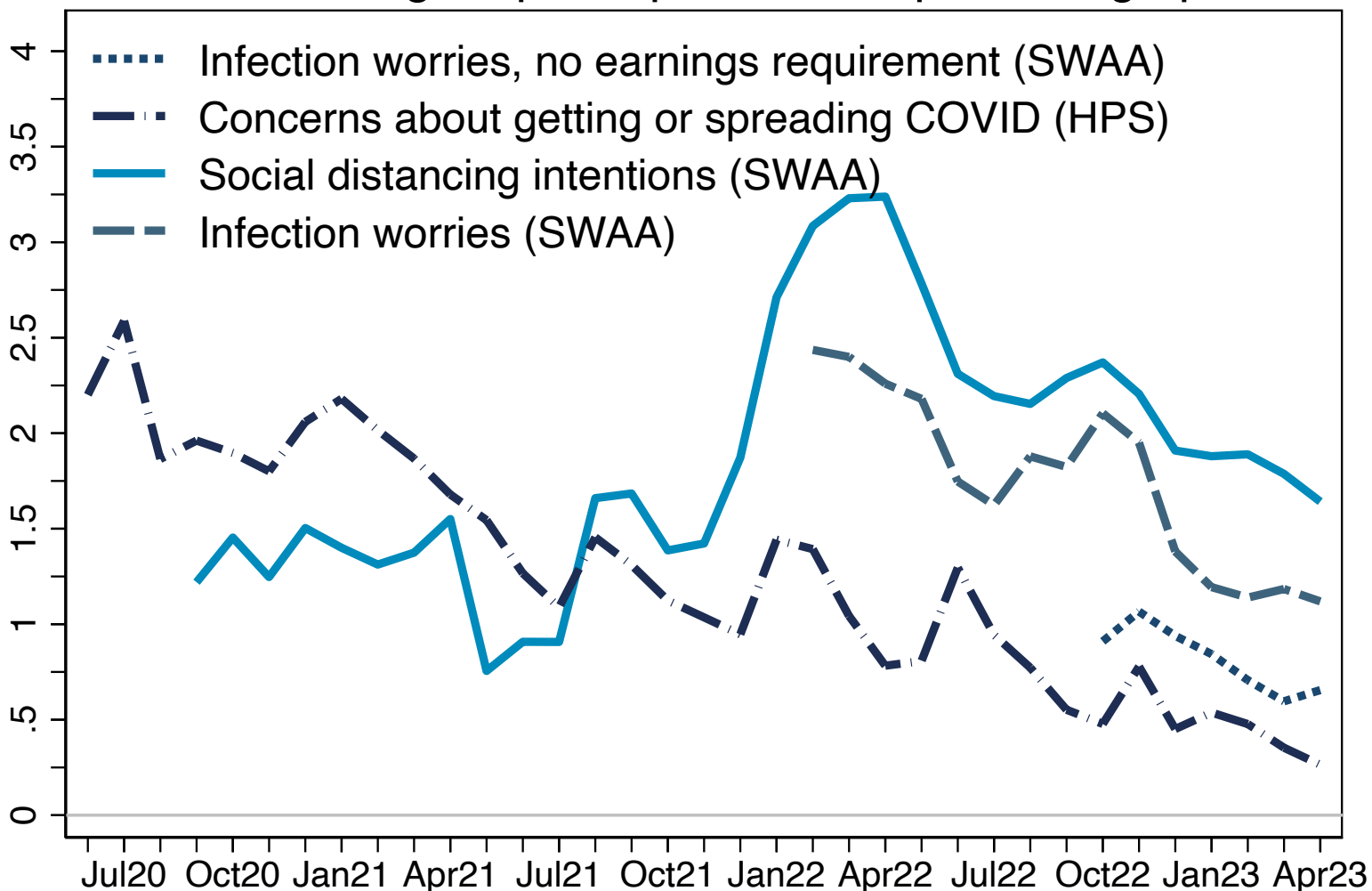
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Question: What is the main reason [second most important reason] you are not currently working and not seeking work?</u>	Percent of Those Currently Out of the Labor Force		Percent of full sample		Contribution of infection worries to LF drag	Implied Drag on LF Participation Rate (ppts)	
Exclude persons with prior-year earnings < \$10,000? →	Yes	No	Yes	No		Yes	No
Main reason is: "I worry about catching COVID or other infectious diseases"	1.3	1.1	0.2	0.3	1	0.2 (0.04)	0.3 (0.05)
Secondary reason is: "I worry about catching COVID or other infectious diseases"	4.5	4.6	0.6	1.3	0.5	0.3 (0.04)	0.7 (0.05)
Other main and second reasons	94.1	94.3	12.6	26.7	0	0.0	0.0
Respondents who are currently employed or unemployed	-	-	86.7	71.7	0	0	0
					Total drag: Equal-Weighted	0.5 (0.05)	1.0 (0.07)
					Earnings-Weighted	0.3 (0.04)	0.4 (0.04)
Observations	1,156	1,909	11,798	13,085		11,798	13,085

Notes: The first four columns report values for respondents who point to infection worries as the main or secondary reason for not working and not seeking work in the survey week – as a percent of persons outside the labor force in Columns 1 and 2, and as a percent of all persons in Columns 3 and 4. The comparisons between columns 1 and 2, and 3 and 4, highlight the impact of limiting the sample to persons with at least \$10,000 in prior-year earnings (the baseline sample). Column 5 assigns numerical values to the indicated responses. Columns 6 and 7 compute the implied drag on the labor force participation rate, as in Table 4. We use SWAA data from October 2022 to January 2023 to implement the calculations.

LF Drag Estimates Over Time

Figure 5. Estimated Labor Force Drag Effects, June 2020 to April 2023

Estimated drag on participation rate, percentage points



Notes: The solid blue line shows the labor force drag associated with social distancing intentions, following the calculations in Table 2 and pooling over the most recent three months of data to construct each monthly estimate. The dashed line shows the drag due to infection worries in SWAA data, using our original self-assessment question and following the calculations in Table A.4. The dotted line shows the drag due to infection worries in SWAA data, using our new self-assessment question with many response options and following the calculations in Table . The dotted line shows a three-month moving average (two months at end points). The dash-dot-dash line shows the drag due to concerns about “getting or spreading COVID,” according to the Household Pulse Survey (HPS). For all four series, we show equal-weighted labor force drag estimates. N=148,548 (social distancing intentions); N=61,698 (infection worries, original question); N=22,944 (infection worries, new question and no prior-earnings requirement); N=2,733,170 (concerns about getting or spreading COVID).

The estimated drag associated with social distancing intentions may appear puzzling in its movements over time and in its high levels. In this regard, we offer four observations.²¹ First, as indicated by the data on COVID deaths shown in Figure 2 (and by data on hospitalizations to treat COVID), the cumulative number of Americans with close personal or vicarious encounters with COVID grew rapidly from August 2021 to February 2022, perhaps doubling from the start to the end of this period. Based on the evidence in Table 5, this development substantially raises the social-distancing drag on participation. For example, if one-fifth of the working-age population transitions from “No Long COVID Experience and No Care of Vulnerable Persons” to personal or vicarious experience with long COVID, it raises the social-distancing drag on participation by about 1.4 percentage points, according to the results in Table 5.²² That helps understand the large rise in the social-distancing drag on participation during late 2021 and early 2022.

Long Social Distancing Effect on Potential Output

- Consider a standard aggregate production function that exhibits constant returns to scale and a labor input elasticity of two-thirds.
- Use an efficiency-units formulation of the aggregate labor input.
 - Weight persons (and groups) by earnings, which accounts for variation in hours worked per employed person.
 - Implicitly, this weighting method also assumes workers are paid their marginal value products, at least on average.
- The implied percentage impact of Long Social Distancing is

$$\text{Potential Output Loss} = 100 \left(\frac{2}{3} \right) \ln(1 - \text{Labor Force Drag})$$

Plugging in the earnings-weighted labor force drag estimate of 1.2 percent implies a loss in potential output of 0.8 percent.

Effect on Output

- U.S. labor markets were extremely tight in 2022
- So, it is reasonable to supplement our potential output calculation with a full-employment assumption.
- With that extra assumption, the analysis also implies that social distancing reduced actual U.S. output by about 0.8% in 2022.
- This is a material effect, corresponding to an annual GDP flow of about \$205 billion dollars at 2022 prices.

Impact on College Wage Premium ,1

Standard Labor Demand Model: Two-factor CES technology. Relative wages are the outcome of a competitive equilibrium. C and HS index college-equivalent and other workers.

- The college wage premium responds to a shift in the relative supply of college-equivalent workers according to

$$\Delta \ln \left(\frac{w^C}{w^{HS}} \right) = - \left(\frac{1}{\sigma} \right) \Delta \ln \left(\frac{L^C}{L^{HS}} \right), \quad (2)$$

where $\Delta \ln \left(\frac{L^C}{L^{HS}} \right)$ is the relative supply shift, σ is the elasticity of substitution between college-equivalent and other workers in production.

- Katz and Murphy (1992) adopt $\sigma = 1.41$ as their preferred estimate for the substitution elasticity. Other studies also conclude that a value in the neighborhood of 1.5 is appropriate for the long-run elasticity of substitution between college-educated and other workers.

Impact on College Wage Premium, 2

- Long Social Distancing reduced the labor force participation of the *HS* group by an estimated 4.8 percentage points. (Table 6)
- College-equivalent group: Averaging LF drag effects over “some college,” “4-year college” & “graduate degree” using sample shares as weights → drag for college-equivalent workers is 1.4 percentage points.
- Putting the pieces together and calculating the right side of (2):

$$-\left(\frac{1}{1.41}\right) \Delta \ln \left(\frac{1-0.016}{1-0.044}\right) = -\left(\frac{1}{1.41}\right) (0.029) = -0.021.$$

- COVID-19 was a surprise event that drove an abrupt increase in the relative supply of college-educated workers. Perhaps the possibilities for substitution between more and less educated workers in the near-term aftermath of the pandemic were more limited than reflected in 1.41 values for the elasticity of substitution. If so, the implied effects on the college wage premium would be greater than suggested by our calculation

Using a Richer Model of the Wage Structure

Posit a nested CES aggregate production function (Card and Lemieux, 2001):

$$y_t = (\theta_h H^\rho + \theta_c C^\rho)^{1/\rho}, \quad (3)$$

with sub aggregates for high-school and college-equivalent workers given by, respectively,

$$H = \left[\sum_j \alpha_j H_j^\eta \right]^{1/\eta} \quad \text{and} \quad C = \left[\sum_j \beta_j C_j^\eta \right]^{1/\eta}, \quad (4)$$

where H_j and C_j are corresponding labor inputs for age-group j . Here, $\rho = 1 - 1/\sigma^E$, where σ^E is the elasticity of substitution between the two education categories. Similarly, $\eta = 1 - 1/\sigma^A$, where η is the partial elasticity of substitution σ^A across age groups in a given education category. The α_j and β_j are group-specific efficiency parameters, which we set to mirror relative hourly wages by age group in each education category as of 2022.

Richer Model, 2

In competitive equilibrium, this production function specification implies that group-level labor supply shifts alter the wage structure according to

$$\Delta \ln(w_j^H) = \left[\frac{1}{\sigma^A} - \frac{1}{\sigma^E} \right] \Delta \ln(H) - \left(\frac{1}{\sigma^A} \right) \Delta \ln(H_j) \quad (5)$$

$$\Delta \ln(w_j^C) = \left[\frac{1}{\sigma^A} - \frac{1}{\sigma^E} \right] \Delta \ln(C) - \left(\frac{1}{\sigma^A} \right) \Delta \ln(C_j), \quad (6)$$

where Δ denotes the shift associated with social distancing.²⁵ We set the $\Delta \ln(H_j)$ and $\Delta \ln(C_j)$ values in (5) and (6) to the corresponding labor force drag estimates reported in Table A.3. The

Richer Model, 3

implied shifts for the aggregated education categories follow from (4):

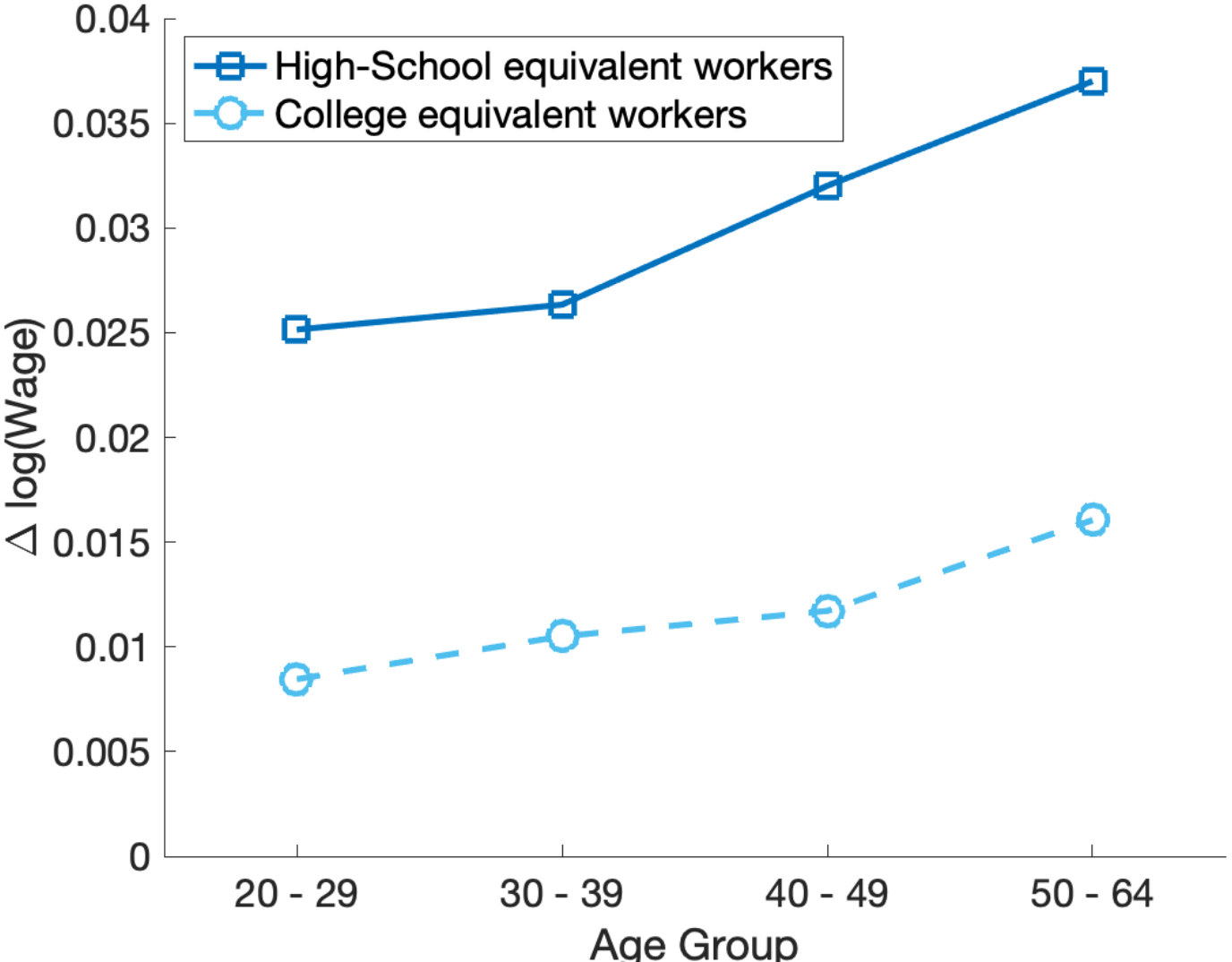
$$\Delta \ln(H) = (1/\eta) \ln \left\{ \left[\sum_j \alpha_j H_j^\eta \right] / \left[\sum_j \alpha_j \tilde{H}_j^\eta \right] \right\} \quad (7)$$

$$\Delta \ln(C) = (1/\eta) \ln \left\{ \left[\sum_j \alpha_j C_j^\eta \right] / \left[\sum_j \alpha_j \tilde{C}_j^\eta \right] \right\}, \quad (8)$$

where H_j and C_j are the observed group-specific labor inputs as of 2022, and \tilde{H}_j and \tilde{C}_j are the counterfactual input values that would have prevailed with no social distancing – i.e., with a “complete return to pre-COVID activities” by all working-age persons. In calculating the H_j and C_j values, we adjust for differences in average hours worked per person by age group. As before, we set $\sigma^E = 1.41$. Following Card and Lemieux, we set $\sigma^A = 5$.

Figure 6. Social Distancing Effects on Labor Supply Raise the Relative Wages of Older and Less Educated Workers

Wage Structure Effects of Social Distancing as of 2022



Notes: We combine estimated drag effects with the labor market equilibrium model of Card and Lemieux (2001) to derive social distancing effects on the wage structure. To do so, we first regress non-participation status on social distancing intentions for each age-education group – i.e., eight separate regressions. Each regression yields a group-level drag effect. We then compute the labor supply shifts implied by the group-level drag effects and measured hours. Finally, we insert the labor supply shifts into the equilibrium model to obtain the implied effects on the age-education structure of mean log wages. When implementing this last step, we set the elasticity of substitution across age groups within an education category to 5 (following Card and Lemieux) and the elasticity between education groups to 1.41 (following Katz and Murphy, 1992). See the text for additional details.

Summary of What We Did

1. Designed and fielded a survey to elicit social distancing intentions and many other individual behaviors, perceptions, and attributes.
2. Used regression methods to relate LF participation status to social distancing intentions and COVID-related experiences and situations.
3. Characterized the C-S and T-S variation in social distancing intentions and their estimated effects on LF participation.
4. Combined our empirical results with simple equilibrium models to quantify the implications of social distancing for (potential) output and the age-education structure of wages.
5. In a separate analysis, we used self-assessed causal effects estimate the impact of infection worries on LF participation.

Extra Slides

Table A.2. The Joint Distribution of Social Distancing Intentions and Infection Worries as a Reason for Not Working

Panel A. Using the Original Self-assessment Question

	(1)	(2)	(3)	(4)
	Type of return to pre-COVID activities			
Worries about catching COVID or other infectious diseases a factor in your decision not to seek work	Complete	Substantial	Partial	None
Yes, the main reason	1.4 (0.2)	2.2 (0.2)	1.9 (0.2)	3.2 (0.2)
Yes, a secondary reason	1.8 (0.2)	4.7 (0.3)	3.2 (0.2)	2.8 (0.2)
No	32.5 (0.7)	18.8 (0.6)	9.6 (0.4)	17.7 (0.5)
Observations	4,991			

Notes: This table shows the joint distribution of responses to the following questions in the February 2022 to January 2023 waves of the SWAA: *Are worries about catching COVID or other infectious diseases a factor in your decision not to seek work at this time?* And, *Once the COVID-19 pandemic has ended, which of the following would best fit your views on social distancing?* The sample includes respondents who are currently not working and not seeking work. Each cell shows the percent of respondents who chose responses given by the respective row and column of the matrix. Standard errors in parentheses.

**Panel B. Using Self-Assessment Question with Many Response Options,
Sample with No Prior-Earnings Requirement**

	(1)	(2)	(3)	(4)
	Type of return to pre-COVID activities			
Main and second most important reason for not working and not seeking work is worry about catching COVID or other infectious diseases	Complete	Substantial	Partial	None
Main reason	0.3 (0.1)	0.3 (0.1)	0.2 (0.1)	0.3 (0.1)
Second most important reason	0.5 (0.2)	1.5 (0.3)	1.1 (0.2)	1.5 (0.3)
Not the main or second most important reason	39.7 (1.1)	25.6 (1.0)	12.8 (0.8)	16.2 (0.8)
Observations	1,909			

Notes: This table shows the joint distribution of responses to the following questions in the October 2022 to January 2023 waves of the SWAA: *What is the main reason [second most important reason] you are not currently working and not seeking work? Once the COVID-19 pandemic has ended, which of the following would best fit your views on social distancing?* The sample covers respondents who are currently not working and not seeking work. Each cell shows the percent of respondents who chose responses given by the respective row and column of the matrix. Standard errors in parentheses.

Table A.3. Estimated Participation Drag Due to Social Distancing for Eight Distinct Age-by-Education Groups

	LF Participation Drag Due to Social Distancing Intentions, percentage points			
	20 to 29	30 to 39	40 to 49	50 to 64
High School Workers	1.3 (0.7)	1.9 (0.7)	4.9 (0.8)	7.5 (1.0)
College Workers	-0.2 (0.5)	0.8 (0.3)	1.4 (0.3)	3.7 (0.5)

Notes: We use SWAA data from January to December 2022, consider respondents who meet the prior-earnings requirement, and partition the sample into eight distinct groups: the four indicated age groups for “High School” workers (including those who did not finish high school) and the four age groups for “College” workers (including those with some college and those with an advanced degree). We separately estimate the labor force participation drag due to social distancing intentions for each of the eight groups following the method illustrated in Table 2. We allow distinct intercepts for those who did and did not finish high school in each regression for “High School” workers. We allow distinct intercepts for those with some college, a four-year degree, and an advanced degree in each regression for “College” workers. Robust standard errors in parentheses.

Table A.4. Using the Original Formulation of the Self-Assessment Question to Estimate the Labor Force Drag Due to Infection Worries

	(1)	(2)	(3)	(4)
Question: Are worries about catching COVID or other infectious diseases a factor in your decision not to seek work at this time?	Percent of those currently outside the labor force	Percent of sample	Contribution of infection worries to labor force drag	Implied drag on LF participation rate (ppts)
Yes, the main reason	7.6	0.9	100	0.9 (0.1)
Yes, a secondary reason	11.7	1.4	50	0.7 (0.1)
No	80.7	10.0	0	0.0 (-)
Respondents who are currently employed or unemployed	-	87.6	-	-
			Total drag: Equal-Weighted	1.7 (0.1)
			Earnings-Weighted	1.2 (0.1)
Observations	1,109	11,885		

Notes: Column 1 reports the question response distribution among persons who are out of the labor force (not working and not seeking work). Column 2 reports the response distribution in the full sample. Column 3 assigns numerical values to each response option. Column 4 is the product of the value in Column 2 and the value in Column 3. We sum these entries in Column 4 to obtain the estimated equal-weighted “Total drag” on the labor force participation rate associated with “worries about catching COVID or other infectious diseases.” We obtain the earning-weighted total drag in the same way except for weighting individuals by their prior-year earnings. We use SWAA data from October 2022 to January 2023 to implement the calculations.

Figure A.1. Age, Education, and Earnings Groups Used in Constructing Cell-Level Weights in the SWAA

Age Groups: 20-29, 30-30, 40-49, 50-64.

Education Groups: Less than high school (HS), HS graduation, 1-3 years of college, 4-year college degree, Master's or Professional Degree, PhD.

Earnings Groups: From May 2020 to March 2021, we use the following annual earnings groups: \$20-50K, \$50-100K, 100-150K, and \$150K+. Starting in April 2021, we add a group for \$10-20K. For the sample that does not impose an earnings requirement, which covers January to February 2022, and June 2022 and later months, we add groups for less than \$5K and \$5-10K.

We sort individuals into earnings groups based on their responses to the type of question at the right, which shows the exact version we fielded from June to December 2022.

Approximately how much did you *earn by working in 2021, on a before-tax basis?*

Q_income_2021 | Multiple choice | Required | Vertical | Single-select

- a) Less than \$5,000 [TAG: 4]
- b) \$5,000 to \$10,000 [TAG: 7.5]
- c) \$10,000 to \$19,999 [TAG: 15]
- d) \$20,000 to \$29,999 [TAG: 25]
- e) \$30,000 to \$39,999 [TAG: 35]
- f) \$40,000 to \$49,999 [TAG: 45]
- g) \$50,000 to \$59,999 [TAG: 55]
- h) \$60,000 to \$69,999 [TAG: 65]
- i) \$70,000 to \$79,999 [TAG: 75]
- j) \$80,000 to \$99,999 [TAG: 90]
- k) \$100,000 to \$124,999 [TAG: 113]
- l) \$125,000 to 149,999 [TAG: 138]
- m) \$150,000 to \$199,999 [TAG: 175]
- n) \$200,000 to \$499,999 [TAG: 225]
- o) \$500,000+ [TAG: 500]

Figure A.2. Attention Check Questions

A. Asked from November 2021

What color is grass?

The fresh, uncut grass, not leaves or hay. Make sure that you select purple as an answer so we know you are paying attention.

Magenta

Green

Purple

Brown

Black

White

Blue

[Continue](#)

B. Asked from December 2021

In how many big cities with more than 500,000 inhabitants have you lived?

Please note that **this question only serves the purpose to check your attention.**

Irrespective of your answer, please insert the number 33.

[Continue](#)

C. Asked from March 2022

What is $3 + 4$?

[Continue](#)

Figure A.3. SWAA Question on Social Distancing Intentions, Version Asked from October 2021 to May 2022

Once the COVID-19 pandemic has ended, which of the following would best fit your views on social distancing?

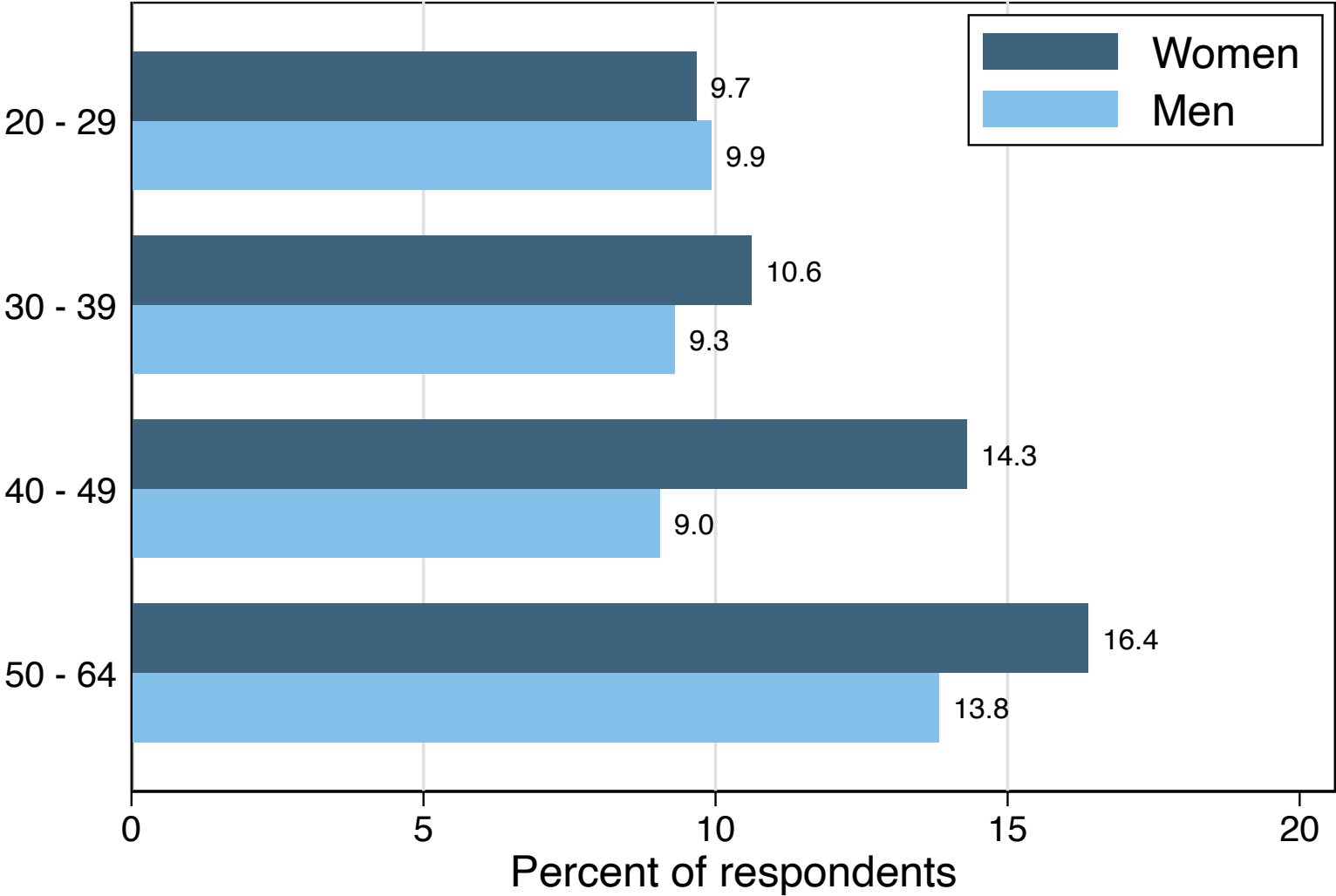
- Complete return to pre-COVID activities
- Substantial return to pre-COVID activities, but I would still be wary of things like riding the subway or getting into a crowded elevator
- Partial return to pre-COVID activities, but I would be wary of many activities like eating out or using ride-share taxis
- No return to pre-COVID activities, as I will continue to social distance

Continue

Note: In June 2022, we randomized over this question and the version stated at the outset of Section 3 in the main text, with 50 percent of the sample receiving each version.

Figure A.4. Strong-Form Social Distancing Is Higher for Women in All But the Youngest Age Group

Strong-Form Social Distancing by Age and Sex

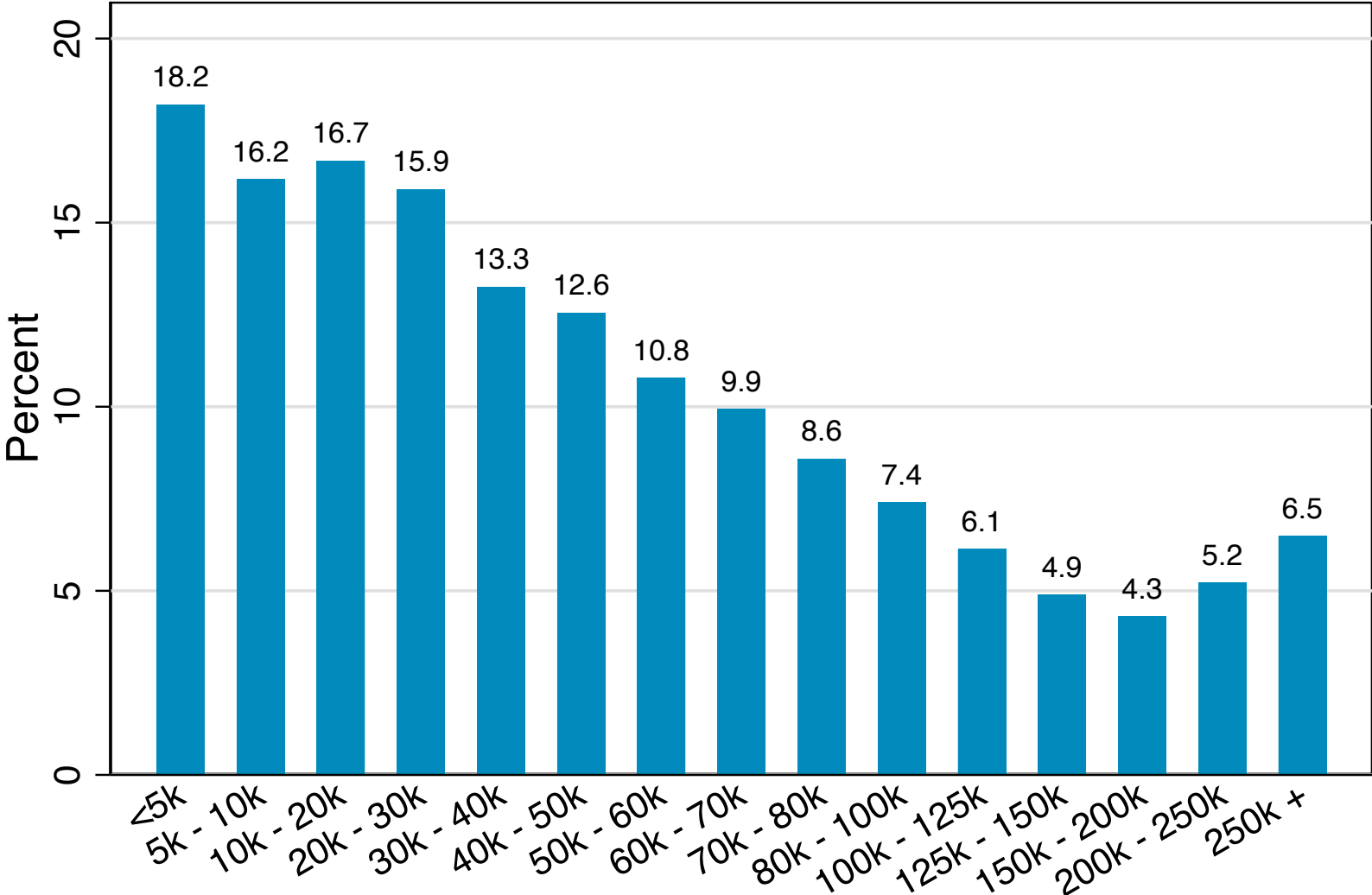


Notes: The sample includes respondents from the February 2022 to January 2023 waves of the SWAA who meet a prior-earnings requirement, as detailed in the notes to Figure 1.

N = 62,751.

Figure A.5. Strong-Form Social Distancing Falls with Earnings

Strong-Form Social Distancing by Earnings



Notes: The sample includes respondents from the February 2022 to January 2023 survey waves and does not impose a prior-earnings requirement. We report equal-weighted means for each earnings bucket.

N = 57,206.

Figure A.6 Strong-Form Social Distancing by Industry

Strong-Form Social Distancing by Industry

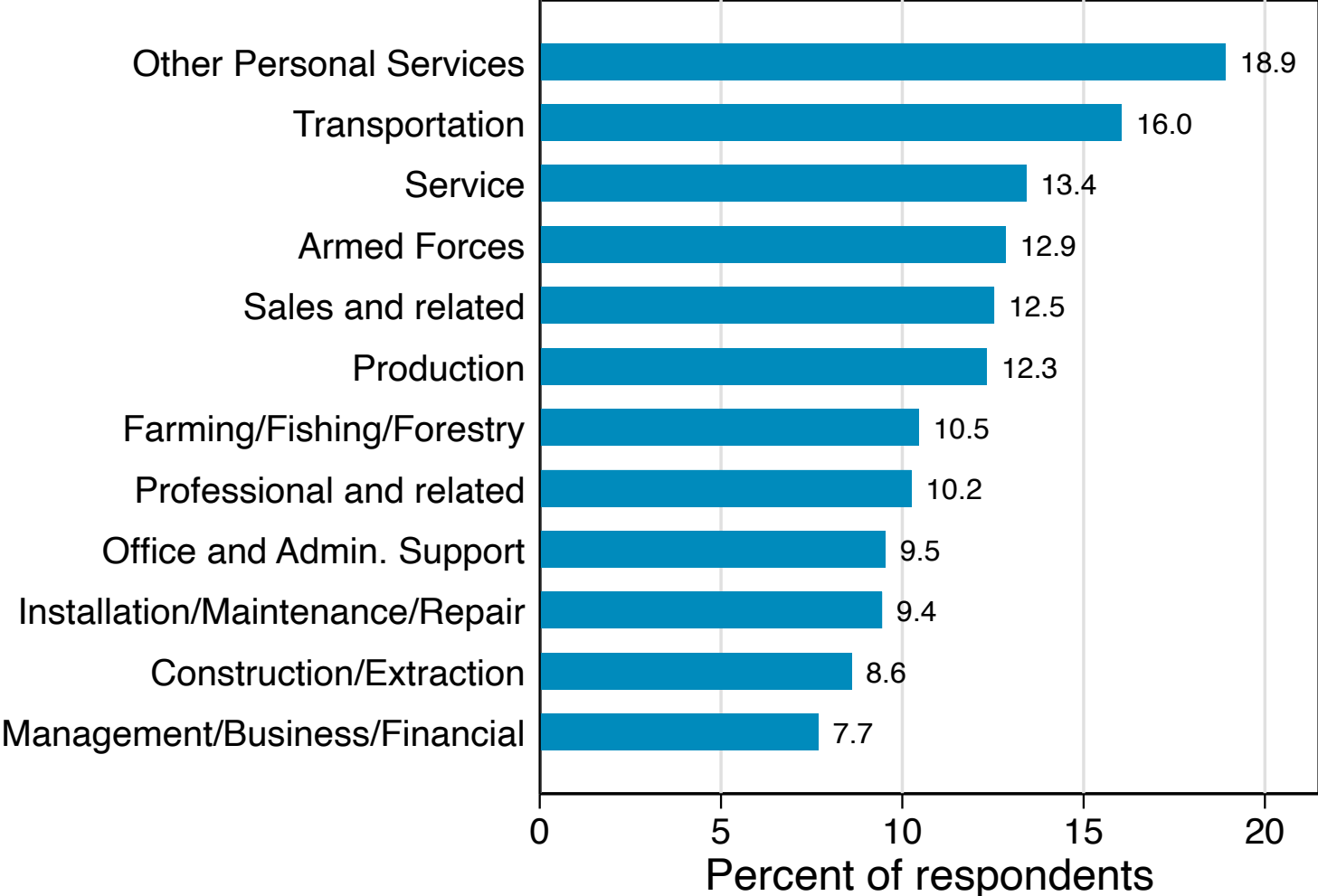


Notes: The sample includes respondents from the February 2022 to January 2023 survey waves who meet a prior-earnings requirement, as detailed in the notes to Figure 1.

N = 55,687.

Figure A.7. Strong-form Social Distancing by Occupation

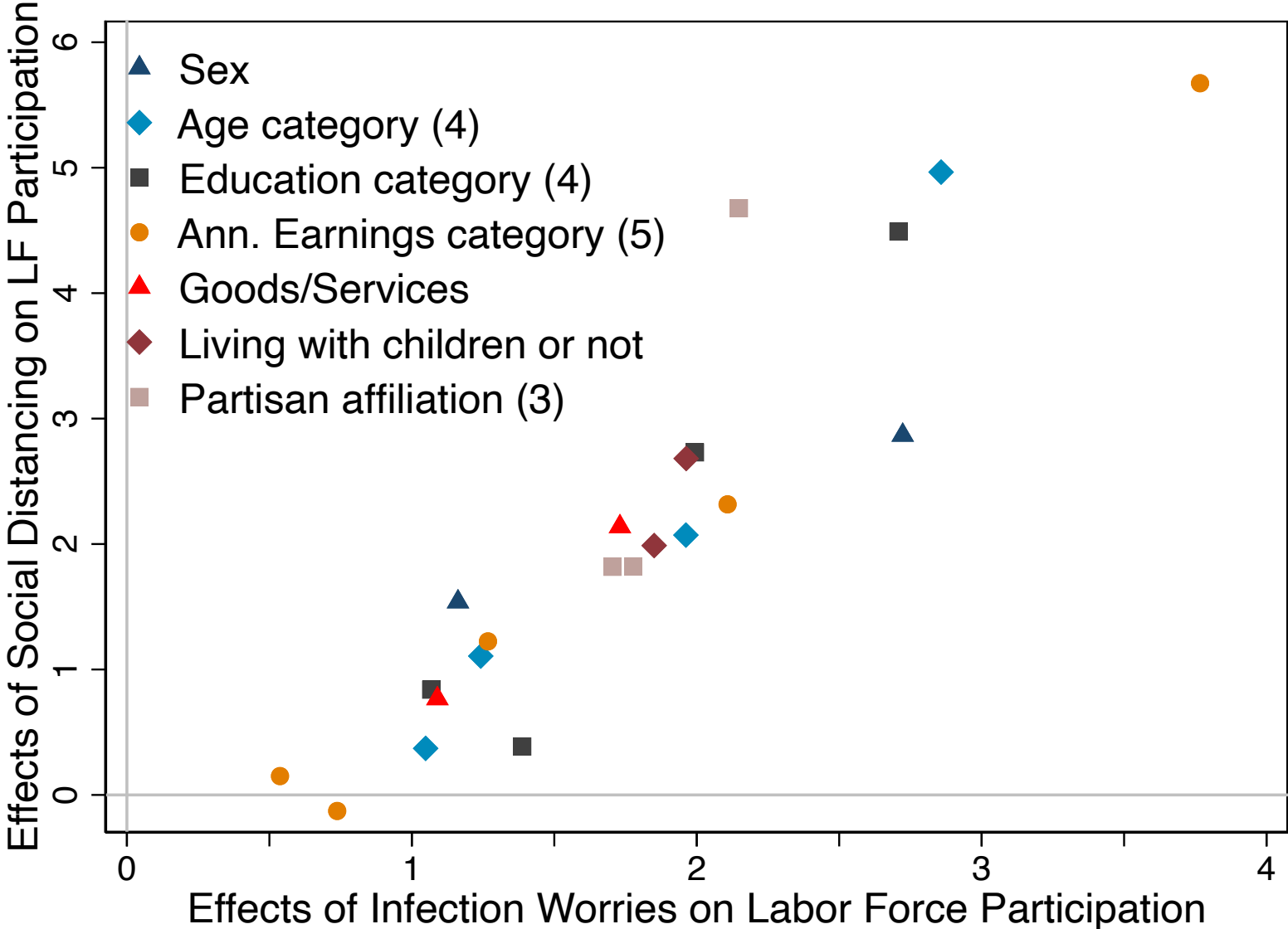
Strong-Form Social Distancing by Occupation



Notes: The sample includes respondents from the February to July 2022 survey waves who meet a prior-earnings requirement, as detailed in the notes to Figure 1.

N = 59,740.

Figure A.8. Social Distancing Intentions and Infection Worries Yield Similar Patterns of Labor Force Drag Across Groups



Note: To estimate the labor force effects of social distancing, we regress $100 \times \mathbf{1}(\text{Not working and not seeking work})$ on social distancing intentions by group and implement the equal-weighted calculations illustrated in Table 2. The specifications include no other controls except in the “No College” regression, which allows distinct intercepts for did and did not finish high school. To estimate the labor force effects of infection worries, we exploit data from our original question on “worries about catching COVID or other infectious diseases” to compute group-level means, implementing the equal-weighted calculations illustrated in Table A.4. The samples used in this chart cover the period from February 2022 to January 2023. All estimated effects are expressed as a percent of the group-specific labor force.