Why Working From Home Will Stick

Jose Maria Barrero,[a] Nick Bloom,[b] and Steven J. Davis[c]

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Abstract: We survey 12,500 Americans over several waves to investigate whether, how, and why working from home will stick after COVID-19. The pandemic drove a mass social experiment in which half of all paid hours were provided from home during May-October 2020. Our survey evidence says that 20 percent of all full work days will be supplied from home after the pandemic ends, compared with just 5 percent before. Mechanisms behind the persistent shift to working from home include diminished stigma, better-than-expected experiences working from home, investments in physical and human capital that enable working from home, reluctance to return to pre-pandemic activities, and network effects that amplify other mechanisms. We also examine some implications of a persistent shift in working arrangements: First, high-income workers, especially, will enjoy large savings in commuting time. Second, we forecast that the post-pandemic shift to working from home will lower consumer spending in major city centers by about 5 percent. Third, re-optimizing working arrangements in light of learnings from the WFH experiment offer the potential to raise productivity as much as 7 percent.

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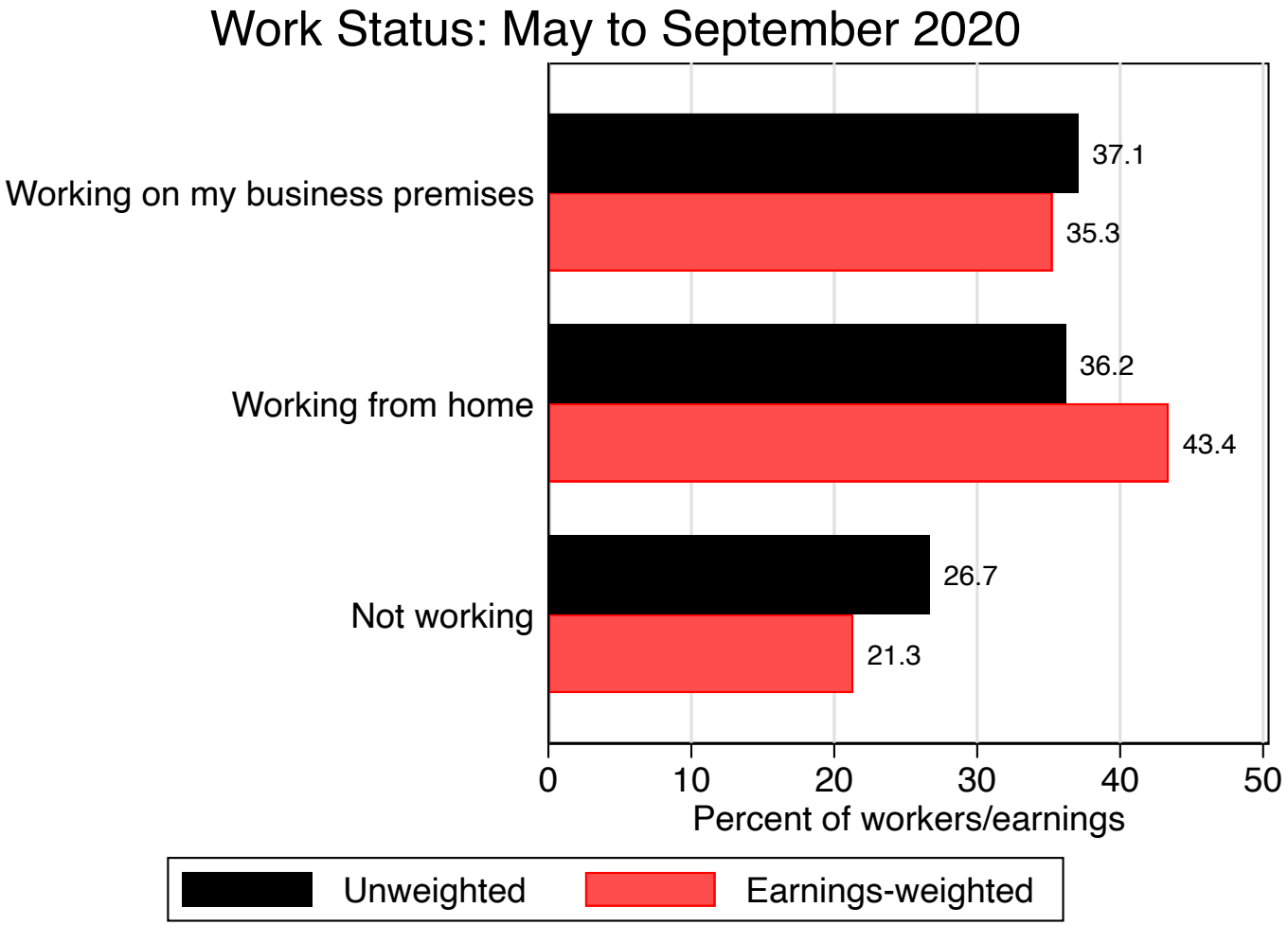
Motivation:

During COVID-19, ~50% of US labor services have been supplied from home



Notes: Data are from three surveys of 12,500 US residents aged 20 to 64, who earned more than $20,000 per year in 2019, that QuestionPro and Inc-Query carried out in four waves between May and October 2020 on behalf of Stanford University. We reweighted the sample of respondents to match Current Population Survey figures by state, industry and labor earnings.

These figures are comparable to numbers in Bick et al. (2020), Brynjolfsson et al. (2020).

Little consensus on how well WFH has worked, how much it will stick, or why

"I don't see any positives. Not being able to get together in person, particularly internationally, is a pure negative."

– Reed Hastings, CEO of Netflix*

Reed Hastings

PHOTO: MANU FERNANDEZ/ASSOCIATED PRESS

*Cited in Cutter (2020)

Little consensus on how well WFH has worked, how much it will stick, or why

"We've seen productivity drop in certain jobs and alienation go up in certain things. So we want to get back to work in a safe way."

– James Dimon, CEO of JPMorgan Chase*

James Dimon

PHOTO: KENA BETANCUR/AGENCE FRANCE-PRESSE/GETTY IMAGES

*Cited in Cutter (2020)

Little consensus on how well WFH has worked, how much it will stick, or why

"We have adapted to work-from-home unbelievably well… We've learned that we can work remote, and we can now hire and manage a company remotely."

– Heyward Donigan, CEO of Rite Aid*

Heyward Donigan

PHOTO: MANDEL NGAN/AGENCE FRANCE-PRESSE/GETTY IMAGES

*Cited in Cutter (2020)

Research Questions

- How much *working from home (WFH)* will there be after the end of the COVID-19 pandemic?

- What economic mechanisms are behind the persistent shift towards WFH?

- What are the implications of more WFH post-COVID?
  - For workers, cities, and policy?

This Paper

1. Survey 12,500 working-age individuals in the US earning >$20k in 2019 between May and October 2020

2. Quantify extent of WFH **during** and **after** the COVID-19 pandemic

3. Discuss mechanisms (and provide **evidence**) for why WFH will stick:
   - Overcoming inertia: **forced experimentation** by individuals and organizations
   - Diminished **stigma**
   - WFH during COVID **better than expected**
   - **Expectations** about post-pandemic return to normality
   - **Investments** at home and at organization level
   - Network effects: **coordination**, **investment in the network**, innovation

4. Implications:
   - **Uneven effects on workers**
   - Spatial **reallocation** of work activity and spending away from **cities**
   - Returns to innovation
   - What it means for policy

Related Literature (more to be added)

- Working from Home (before COVID): Bloom et al. (2013)
- Working from Home (during COVID): Barrero et al. (2020), Bick et al. (2020), Brynjolffson et al. (2020), Cicala (2020)
- Pandemic-induced shift toward technologies that support working from home: Bloom, Davis and Zhestikova (2020)

Outline

- **Survey and methodology**
- The state of working from home
- The future of WFH
  - How much?
  - Why it will stick
- Implications
  - Effects on workers
  - Spatial reallocation of worker spending
  - Policy

Surveying 12,500 US Workers

- Four waves (repeated cross sections) conducted via commercial survey providers:
  - May: 2,500
  - July: 2,500
  - August: 5,000
  - September/October: 2,500

- Target population: working age pop, >$20K earnings in 2019
  - Re-weight to match 2010-2019 CPS pop. by {*earnings* x *industry* x *state}* cell

- ~40 questions on:
  - Demographics
  - Extent of WFH *during* COVID. Also desires/plans *after* COVID
  - Experience, perspectives on WFH

Sample Survey Questions

3. ***Currently (this week)*** what is your work status?

- ○ Working on my business premises
- ○ Working from home
- ○ Still employed and paid, but not working
- ○ Unemployed
- ○ Not working, and not looking for work

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6. ***After COVID, in 2022 and later,*** how often ***is your employer planning*** for you to work full days at home?

- ○ Never
- ○ About once or twice per month
- ○ 1 day per week
- ○ 2 days per week
- ○ 3 days per week
- ○ 4 days per week
- ○ 5+ days per week
- ○ My employer has not discussed this matter with me or announced a policy about it
- ○ I have no employer

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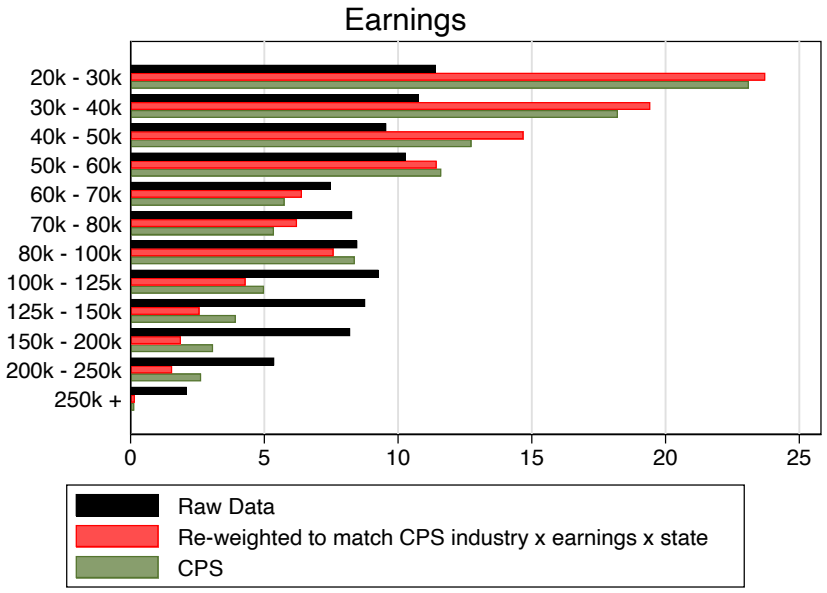
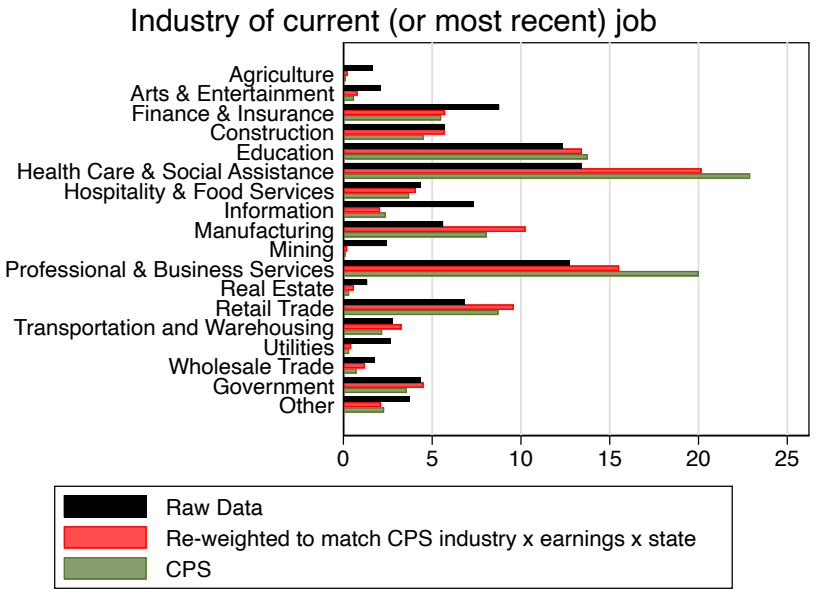
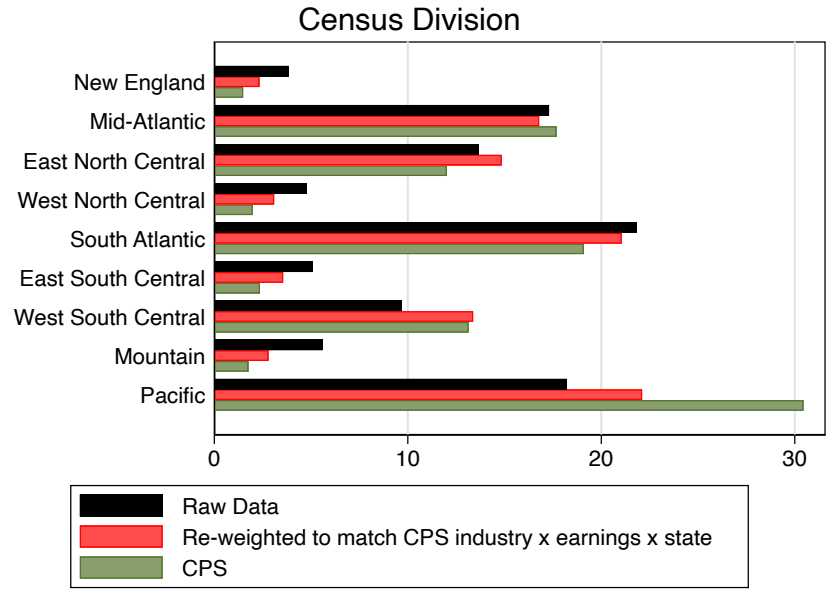
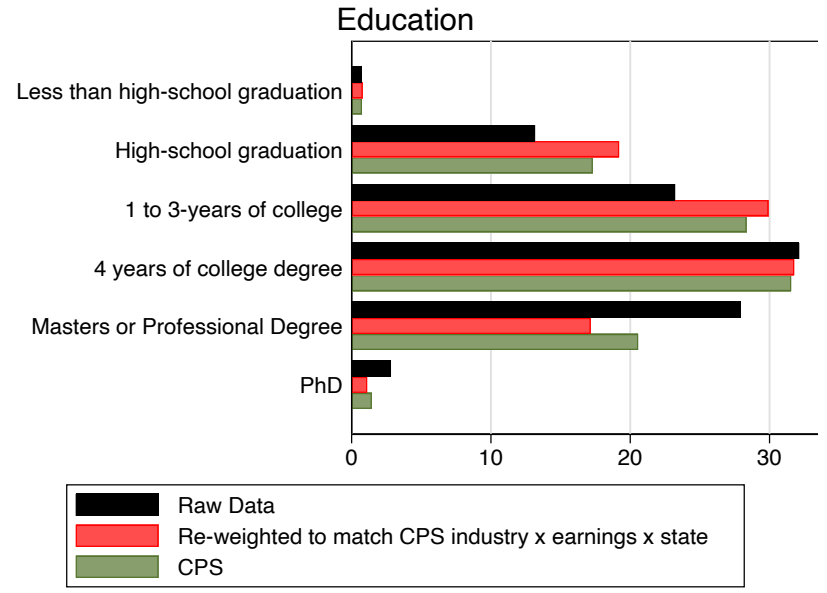
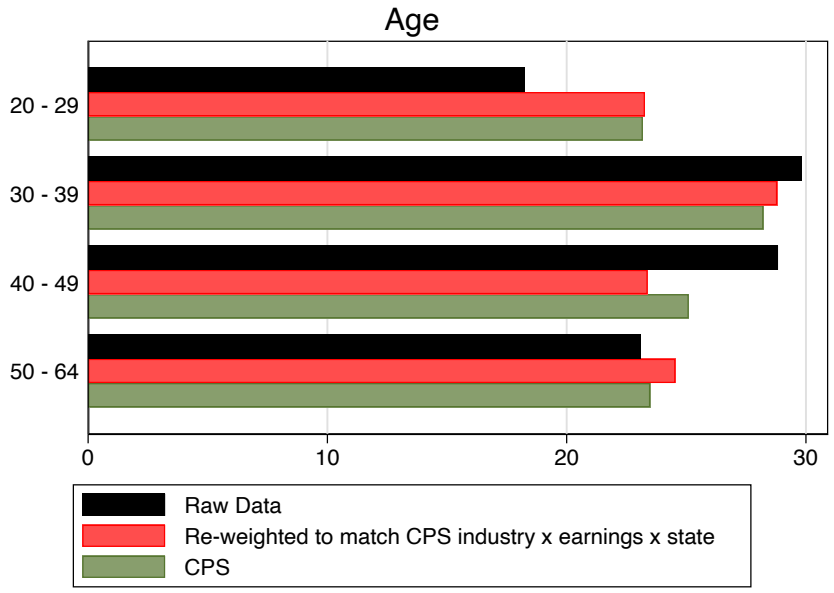
Survey Responses vs. CPS

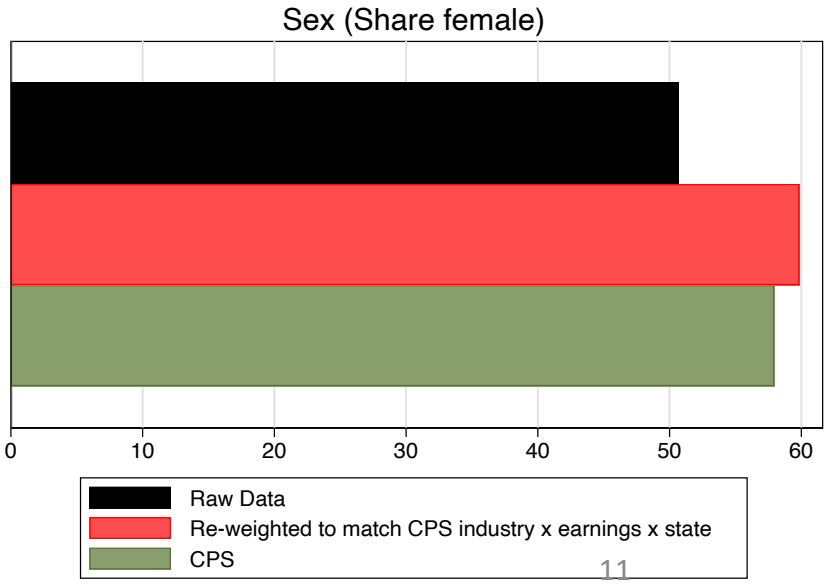












Summary Statistics

Variable	Mean	SD	p25	p50	p75	N
Earnings, $'000s	58.1	53.9	35	45	65	11,524
Age	40.4	11.7	35	35	45	11,524
Years of education	15.0	2.1	14	16	16	11,524
100***1**(Ever WFH during COVID?)	56.6	49.6	0	100	100	6,484
100***1**(Currently WFH during COVID)	36.2	48.1	0	0	100	11,524
Percent pre-COVID WFH days	16.2	32.0	0	0	20	9,361
Percent desired post-COVID WFH days	44.4	40.2	0	40	100	11,524
Percent employer planned post-COVID WFH days	23.1	35.8	0	0	40	7,856
Commute time pre-COVID (minutes)	27.8	26.5	10	20	35	11,517
Percent raise equal to option to WFH 2-3 days/week	7.1	12.0	0	5	13	10,150
How much more productive than expected has WFH been?	7.1	12.3	0	5	15	4,397
Can you do your job from home (0 to 100 % scale)	74.5	58.8	7	85	100	5,040
Percent higher effectiveness WFH during COVID over business premises pre-COVID	4.1	16.5	0	0	13	4,812
Investments in infrastructure, equipment for WFH by employer or self, $	580.0	1233.7	0	50	500	4,789
Hours invested learning to WFH effectively	13.0	20.7	2	6	18	4,805
Weekly spending near work, $	156.4	168.9	37	100	210	7,934
100 x 1(Female)	59.9	49.0	0	100	100	11,524
100 x 1(Red State)	42.8	49.5	0	0	100	11,524

Notes: Summary statistics for key variables, re-weighted to match the share of people in the 2010-2019 CPS in each {industry x state x earnings} cell. Data are from four survey waves in May, July, August, and September/October 2020 with 2,500 responses in the first two and thelast, plus 5,000 in August. Not all questions (and hence not all variables) appear in all waves. Number of observations is less than the 12,500 survey responses primarily due to dropping responses that took less than 3 minutes to respond.

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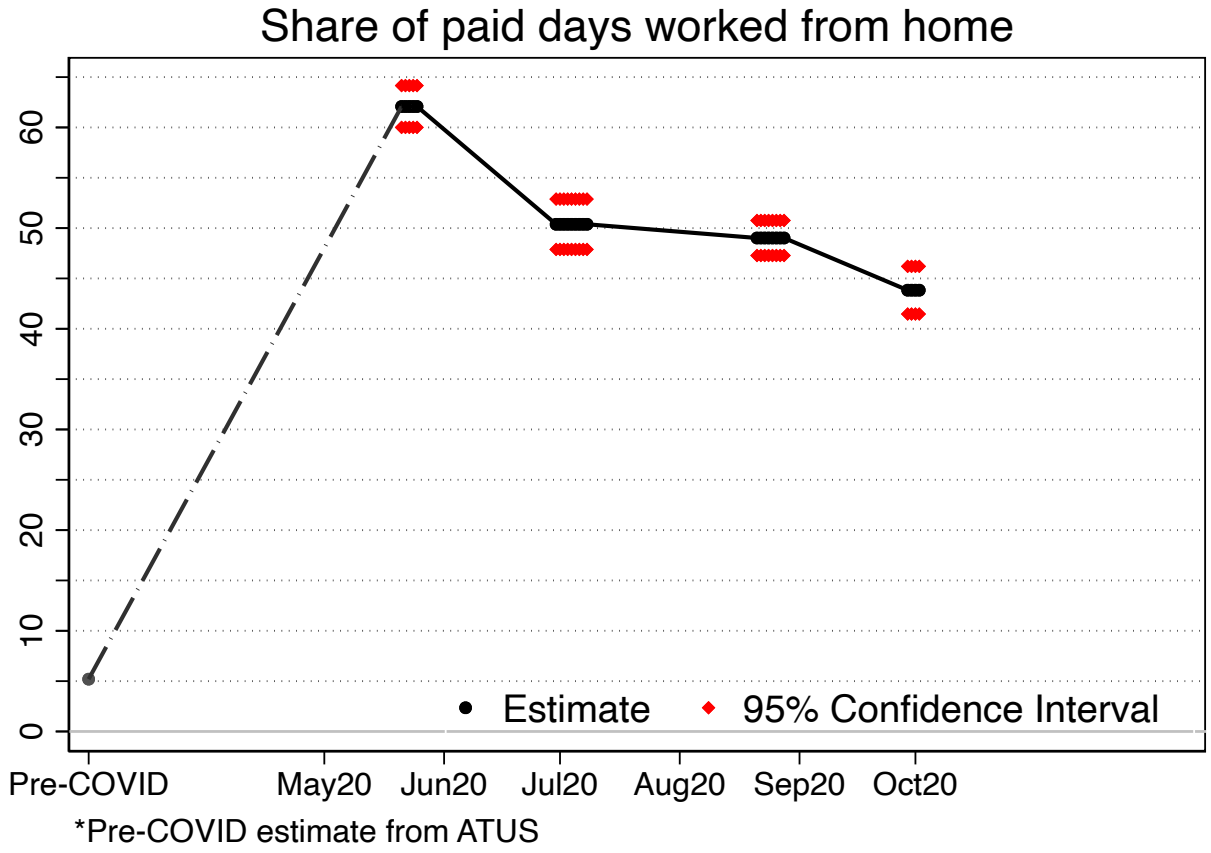
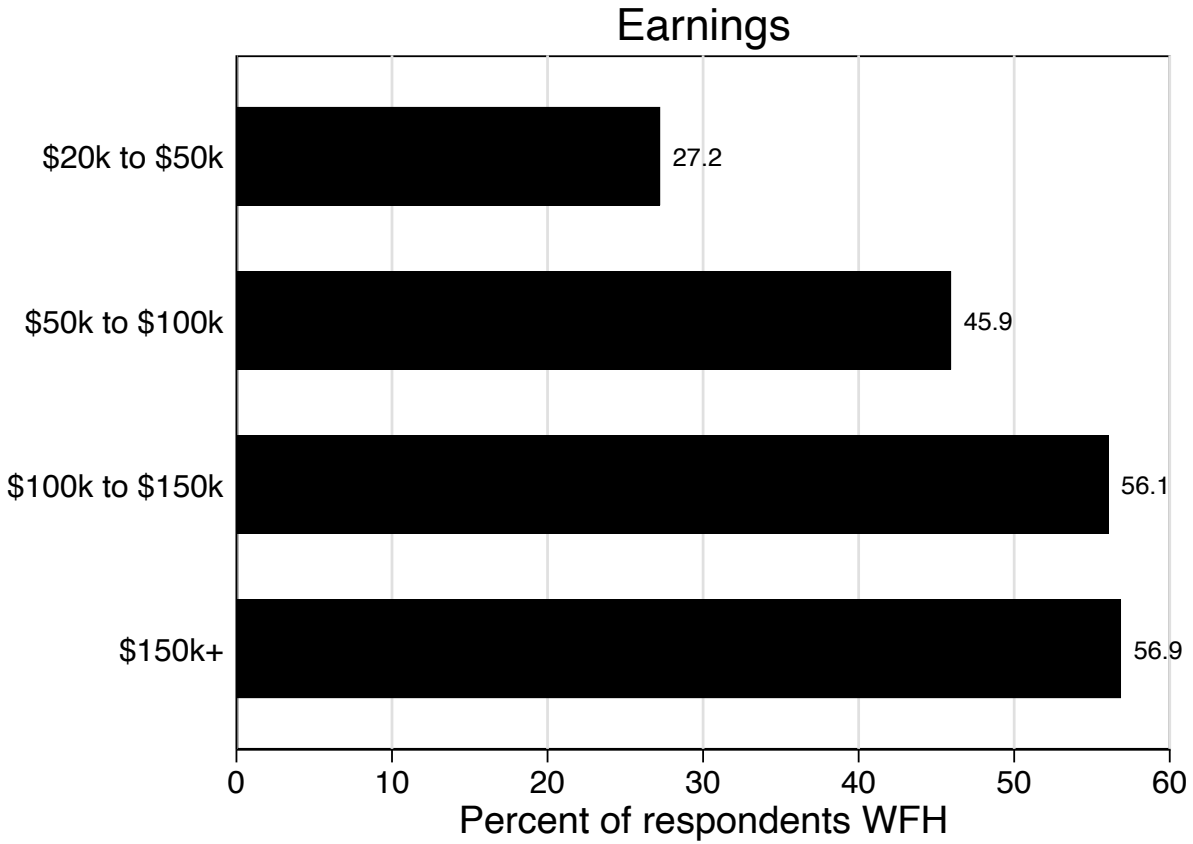
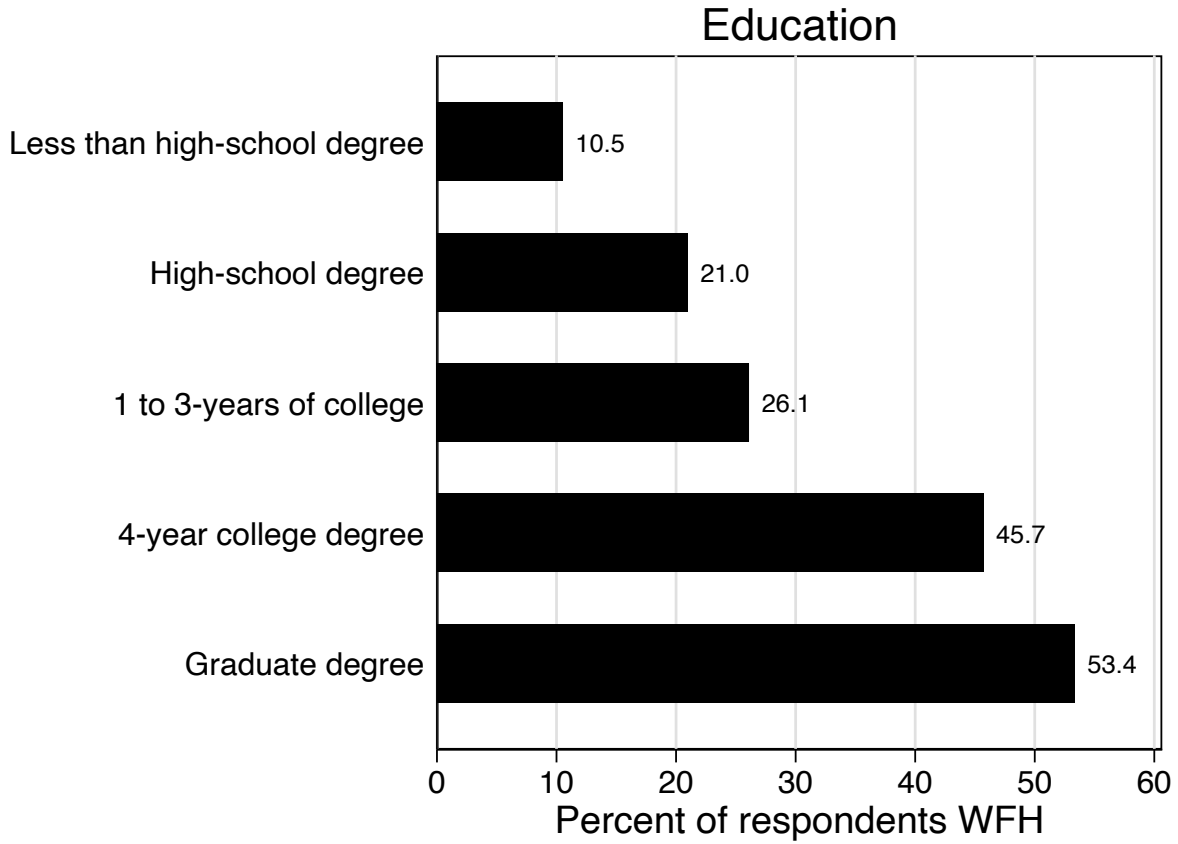
During COVID, 10 - 12 x level of pre-COVID WFH



Notes: Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Working from home during COVID is concentrated among high-earning, highly educated





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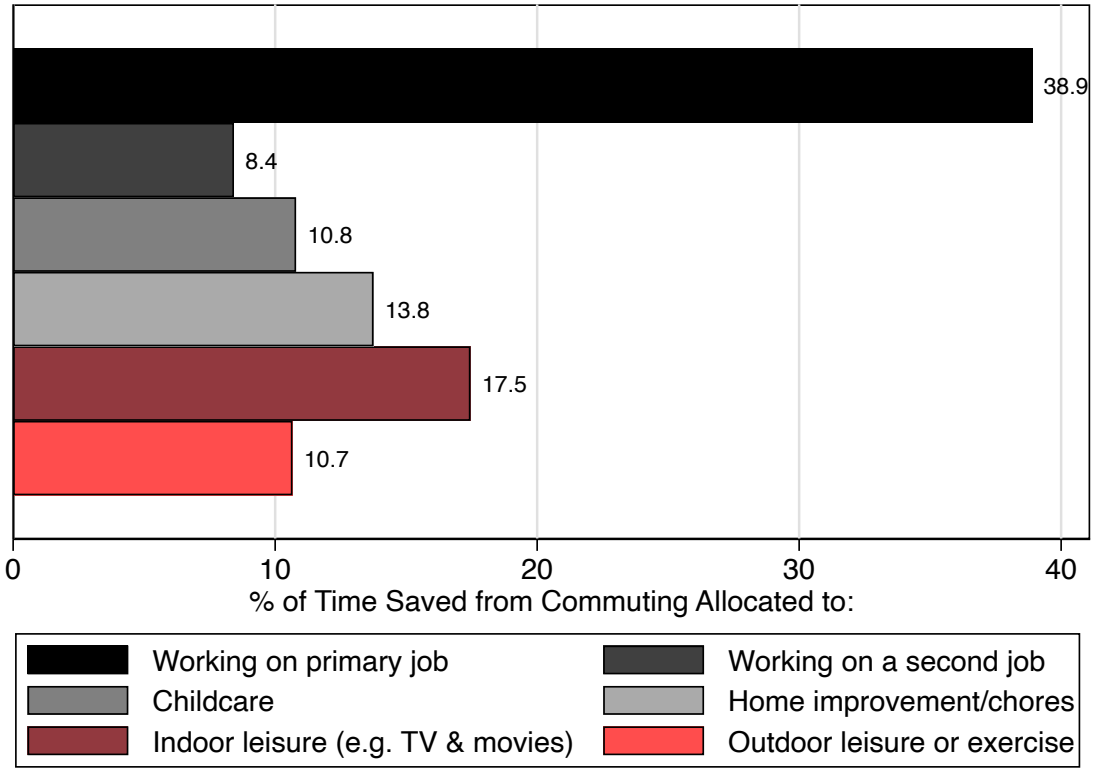
Share of respondents WFH during COVID-19

Percent of respondents WFH during COVID	Estimate	(SE)
Overall	36.2	(0.4)
Women	33.7	(0.6)
Men	40.1	(0.7)
Age 20 to 29	36.3	(1.0)
Age 30 to 39	41.7	(0.8)
Age 40 to 49	37.4	(0.9)
Age 50 to 64	28.6	(0.9)
Less than high school	10.5	(3.5)
High school	21.0	(1.0)
1 to 3 years of college	26.1	(0.8)
4year college degree	45.7	(0.8)
Graduate degree	53.4	(0.9)

Percent of respondents WFH during COVID	Estimate	(SE)
Overall, ever WFH during COVID	56.6	(0.6)
Ann. Earnings of $20 to $50K	27.2	(0.7)
Ann. Earnings of $50 to $100K	46.0	(0.8)
Ann. Earnings of $100 to $150K	56.1	(1.1)
Ann. Earnings over $150K	56.9	(1.2)
Goods-producing sectors	28.4	(1.1)
Service sectors	37.8	(0.5)
No children	32.8	(0.8)
Living with children under 18	37.5	(0.7)
Red state	32.6	(0.7)
Blue state	38.9	(0.6)

Notes: Percent share of respondents who are working from home ("this week") during the COVID19 pandemic, except the top right which estimates the share who "ever" worked from home during the pandemic. Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

They save 60M commuting hours per day. Where does that time go?



During the COVID-19 pandemic, while you have been working from home, how are you now spending the ***time you have saved by not commuting?***

Please assign a percentage to each activity (the total should add to 100%).

- Working on your current or primary job
- Working on a second or new secondary job
- Childcare
- Home improvement, chores, or shopping
- Leisure indoors (e.g. reading, watching TV and movies)
- Exercise or outdoor leisure

Notes: Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Commute time savings

	Percent of Commuting Time Saved Spent on											
	Primary Job		**Second Job**		**Childcare**		**Home improvement/chores**		**Indoor leisure**		**Outdoor leisure**	
Overall	38.9	(0.7)	8.4	(0.3)	10.8	(0.4)	13.8	(0.4)	17.5	(0.5)	10.7	(0.3)
Women	40.0	(1.1)	6.7	(0.5)	9.9	(0.6)	14.5	(0.6)	18.2	(0.8)	10.7	(0.5)
Men	37.6	(0.8)	10.5	(0.4)	11.8	(0.5)	12.9	(0.4)	16.6	(0.5)	10.6	(0.4)
No children	43.1	(1.2)	6.0	(0.5)	3.5	(0.3)	14.3	(0.6)	21.8	(0.8)	11.3	(0.6)
Living with children under 18	35.0	(0.8)	10.8	(0.4)	17.5	(0.6)	13.3	(0.4)	13.3	(0.5)	10.1	(0.4)
Less than high school	39.5	(11.3)	4.9	(4.1)	26.1	(7.2)	9.8	(3.4)	7.9	(4.0)	11.7	(4.7)
High school	42.2	(2.6)	11.9	(1.5)	9.4	(1.2)	12.4	(1.1)	14.3	(1.4)	10.0	(1.1)
1 to 3 years of college	39.4	(1.7)	8.7	(0.9)	10.2	(1.0)	13.8	(0.9)	17.1	(1.2)	10.7	(0.9)
4-year college degree	39.5	(1.1)	6.8	(0.5)	10.1	(0.7)	13.9	(0.6)	19.2	(0.8)	10.5	(0.5)
Graduate degree	36.0	(1.0)	9.0	(0.4)	12.8	(0.6)	14.2	(0.5)	16.8	(0.7)	11.2	(0.5)

Notes: Data are from two survey waves carried out by QuestionPro and IncQuery in August, and September 2020 with 2,500 responses in the last plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Bottom line: COVID-19 *forced* firms to experiment with WFH

"If you'd said three months ago that 90% of our employees will be working from home and the firm would be functioning fine, I'd say that is a test I'm not prepared to take because the downside of being wrong on that is massive."

– James Gorman, CEO of Morgan Stanley*

James Gorman

PHOTO: AL DRAGO/BLOOMBERG NEWS

*Cited in Cutter (2020)

Recap

- Mass experiment in WFH during COVID
- High-earning, highly-educated individuals disproportionately participating
- Already find economic shifts:
  - Commuting time reallocated primarily to work activities

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- Survey and methodology
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- **The future of WFH**
  - How much?
  - Why it will stick
- Implications
  - Effects on workers
  - Spatial reallocation of worker spending
  - Policy

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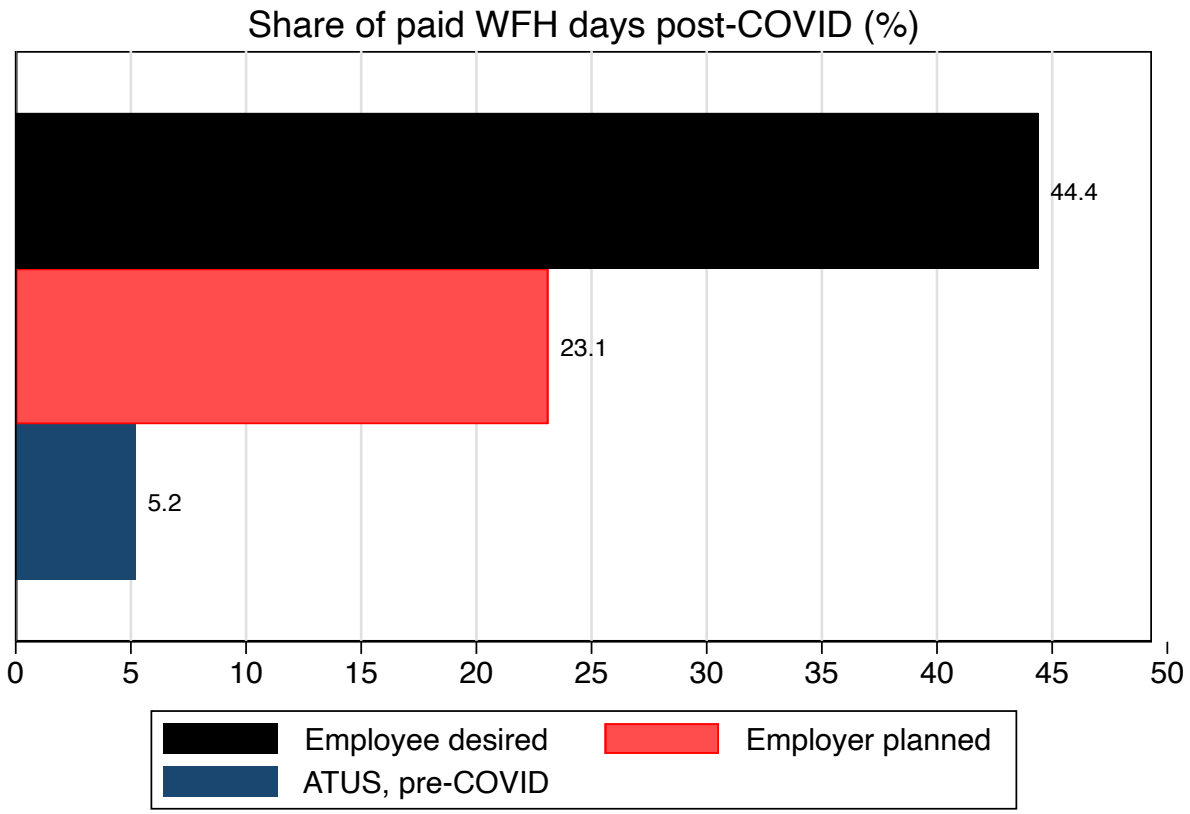
Huge demand for WFH from workers. Substantial plans from employers.



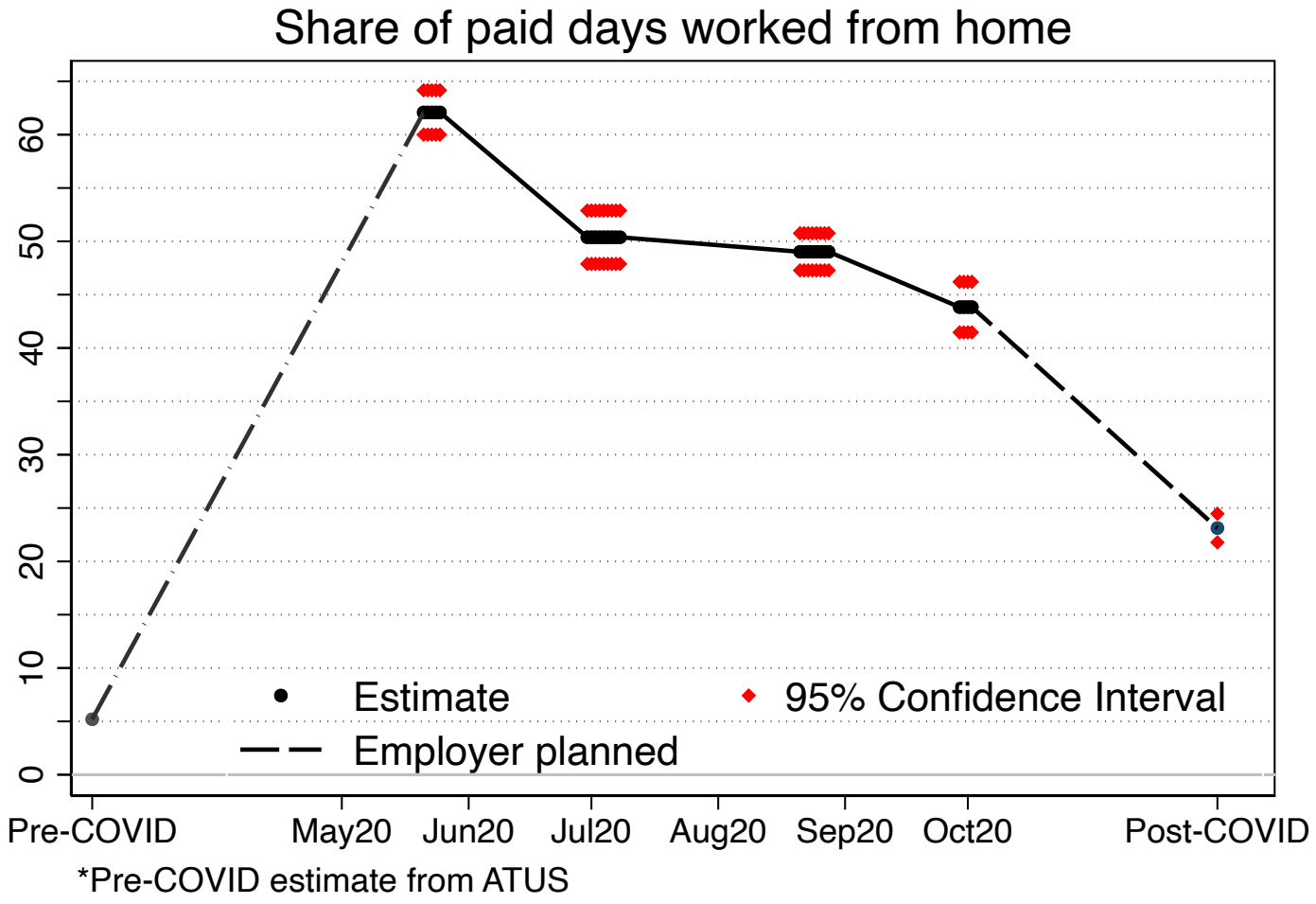
After COVID, in 2022 and later, how often would you ***like to*** have paid workdays at home?

After COVID, in 2022 and later, how often ***is your employer planning*** for you to work full days at home?

- Never
- About once or twice per month
- 1 day per week
- 2 days per week
- 3 days per week
- 4 days per week
- 5+ days per week
- My employer has not discussed this matter with me or announced a policy about it
- I have no employer

Notes: Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings}

Post-COVID: Substantially less WFH than now Substantially more than before



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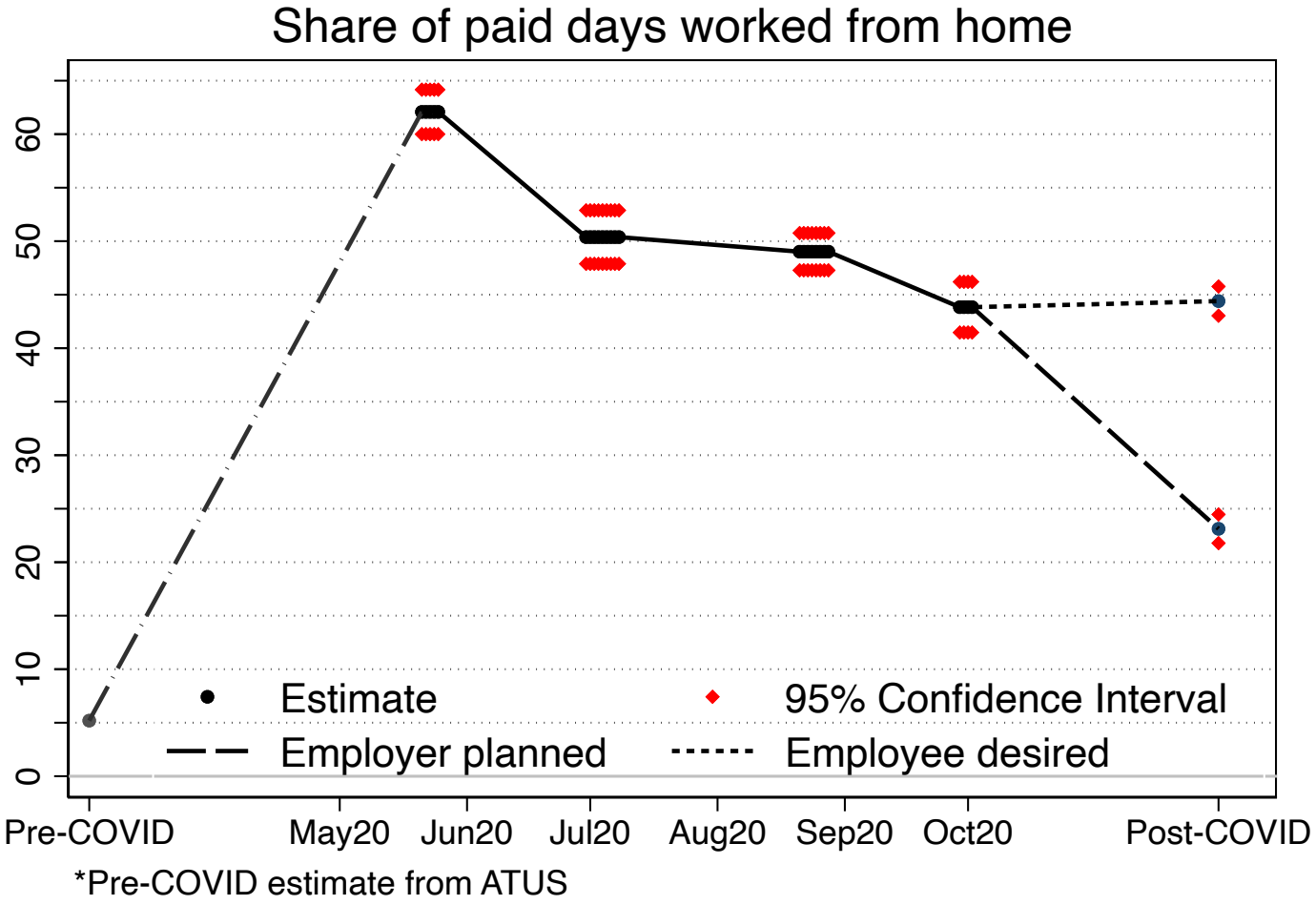
Post-COVID: Substantially less WFH than now
Substantial gap between employers/employees



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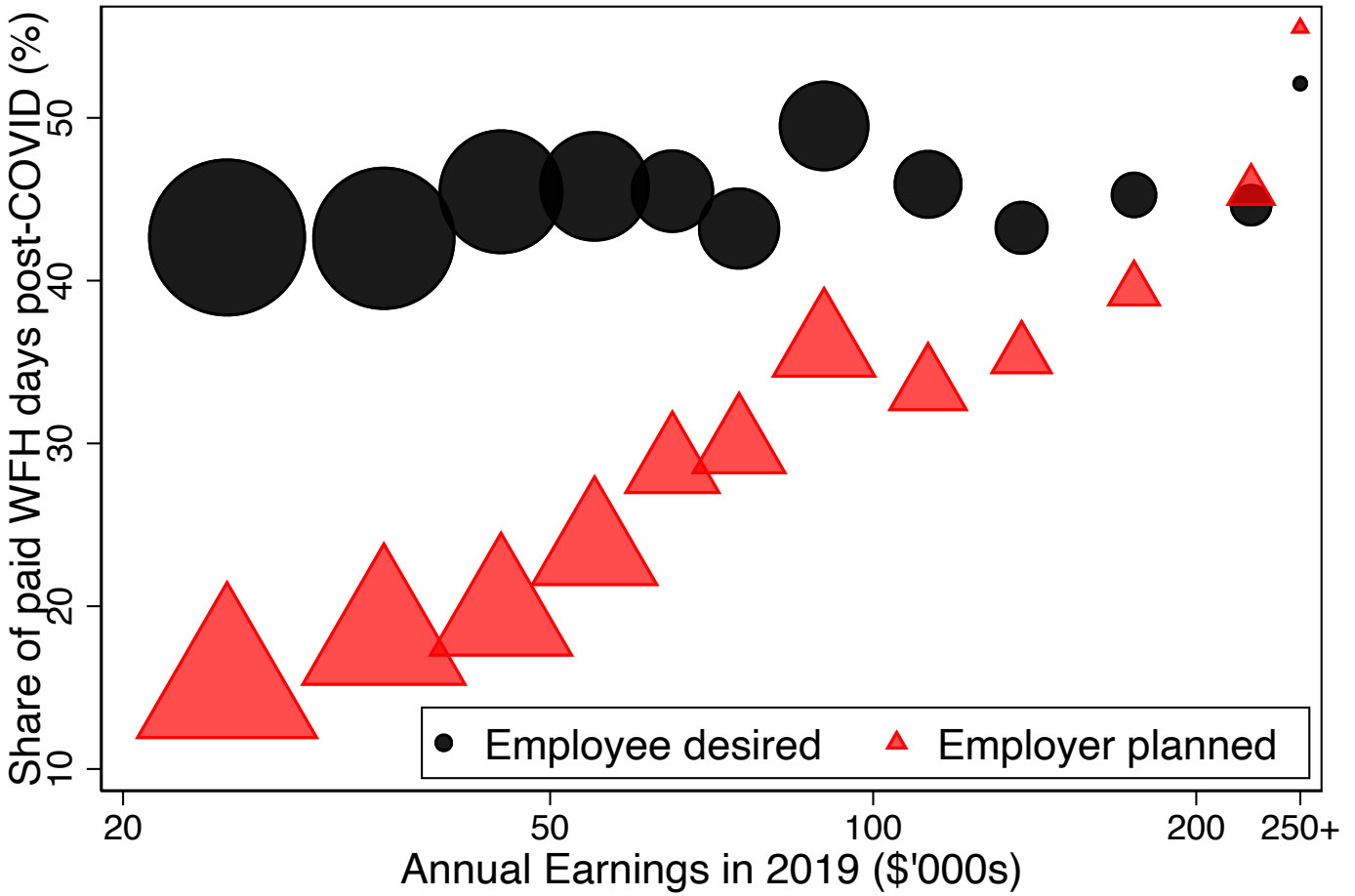
Worker-desired WFH is fairly uniform. Employer plans increase with earnings.



Note: Marker size is proportional to the number of respondents per income level.

Notes: Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Worker-desired WFH is fairly uniform. Employer plans are not.

Percent share of paid WFH days post-COVID	Employee desired	(SE)	Employer planned	(SE)
Overall	44.2	(0.4)	23.1	(0.4)
Women	46.1	(0.7)	20.0	(0.6)
Men	41.5	(0.6)	27.7	(0.6)
Age 20 to 29	42.1	(1.0)	25.2	(0.9)
Age 30 to 39	46.8	(0.8)	27.2	(0.7)
Age 40 to 49	46.1	(0.9)	24.1	(0.8)
Age 50 to 64	41.0	(1.1)	14.2	(0.8)
Less than high school	38.3	(5.4)	18.1	(4.7)
High school	39.1	(1.3)	15.4	(0.9)
1 to 3 years of college	44.5	(1.0)	20.0	(0.8)
4year college degree	46.7	(0.8)	25.6	(0.7)
Graduate degree	44.8	(0.8)	31.4	(0.8)

Percent share of paid WFH days post-COVID	Employee desired	(SE)	Employer planned	(SE)
Ann. Earnings of $20 to $50K	42.2	(0.8)	17.3	(0.7)
Ann. Earnings of $50 to $100K	46.9	(0.7)	28.7	(0.7)
Ann. Earnings of $100 to $150K	46.2	(1.0)	34.2	(1.0)
Ann. Earnings over $150K	46.4	(1.1)	42.8	(1.1)
Goods-producing sectors	38.9	(1.1)	19.8	(0.9)
Service sectors	45.2	(0.5)	23.8	(0.4)
No children	43.6	(0.7)	18.4	(0.6)
Living with children under 18	45.1	(0.6)	27.9	(0.6)
Red (Republican) State	43.5	(0.7)	21.9	(0.6)
Blue (Democratic) State	44.7	(0.6)	24.0	(0.5)

Notes: Percent share of respondents who are working from home ("this week") during the COVID19 pandemic, except the top right which estimates the share who "ever" worked from home during the pandemic. Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We reweight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Bottom line: Post-COVID WFH appears to weigh the pros and cons

"In all candor, it's not like being together physically….[But] I don't believe that we'll return to the way we were because we've found that there are some things that actually work really well virtually."
– Tim Cook, CEO of Apple*

Tim Cook
PHOTO: APPLE INC.

*Cited in Cutter (2020)

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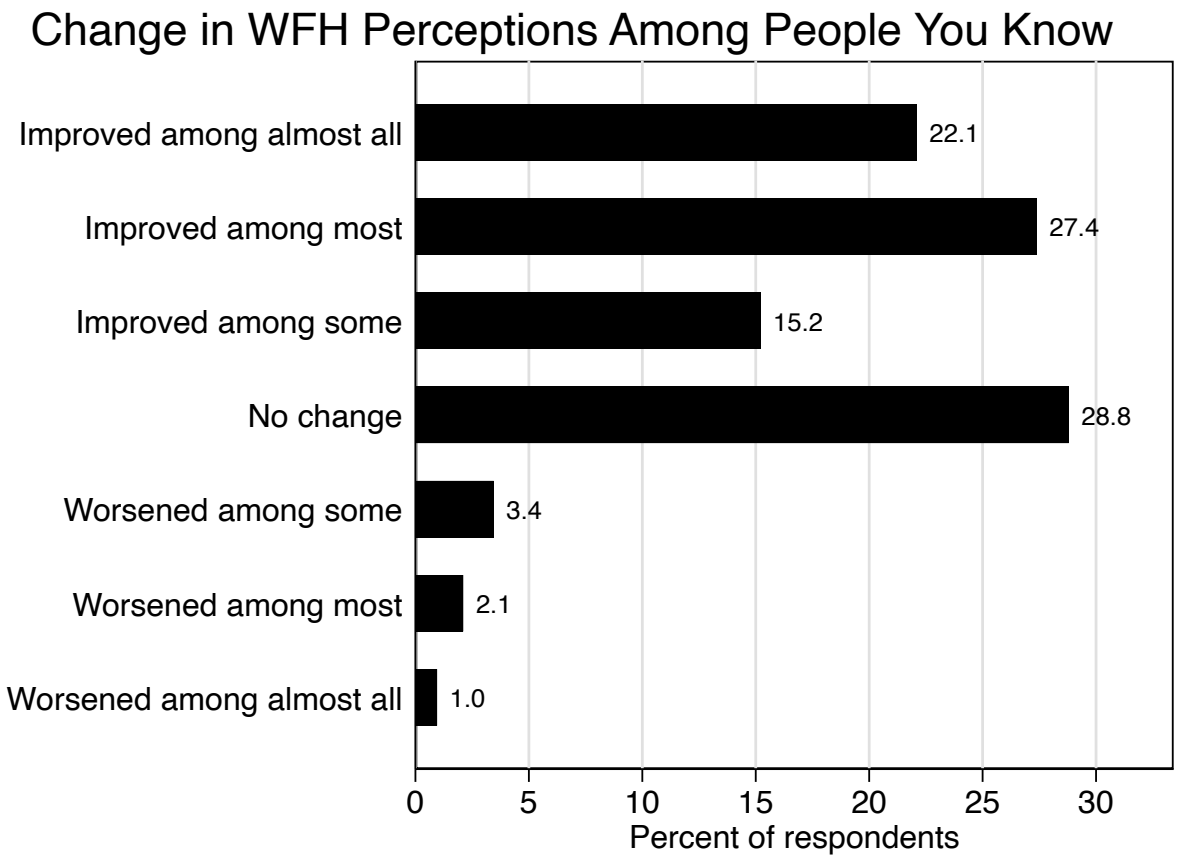
WFH stigma has diminished



Before COVID-19, "*working from home*" was sometimes seen as "*shirking from home*." Since the COVID pandemic began, ***how have perceptions about working from home (WFH) changed among people you know?***

- Hugely improved -- the perception of WFH has improved among almost all (90-100%) the people I know
- Substantially improved -- the perception of WFH has improved among most but not all of the people I know
- Slightly improved -- the perception of WFH has improved among some people I know but not most
- No change
- Slightly worsened -- the perception of WFH has worsened among some, but not most, people I know
- Substantially worsened -- the perception of WFH has worsened among most, but not all, people I know
- Hugely worsened -- the perception of WFH has worsened among almost all (90-100%) the people I know

Notes: Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings}

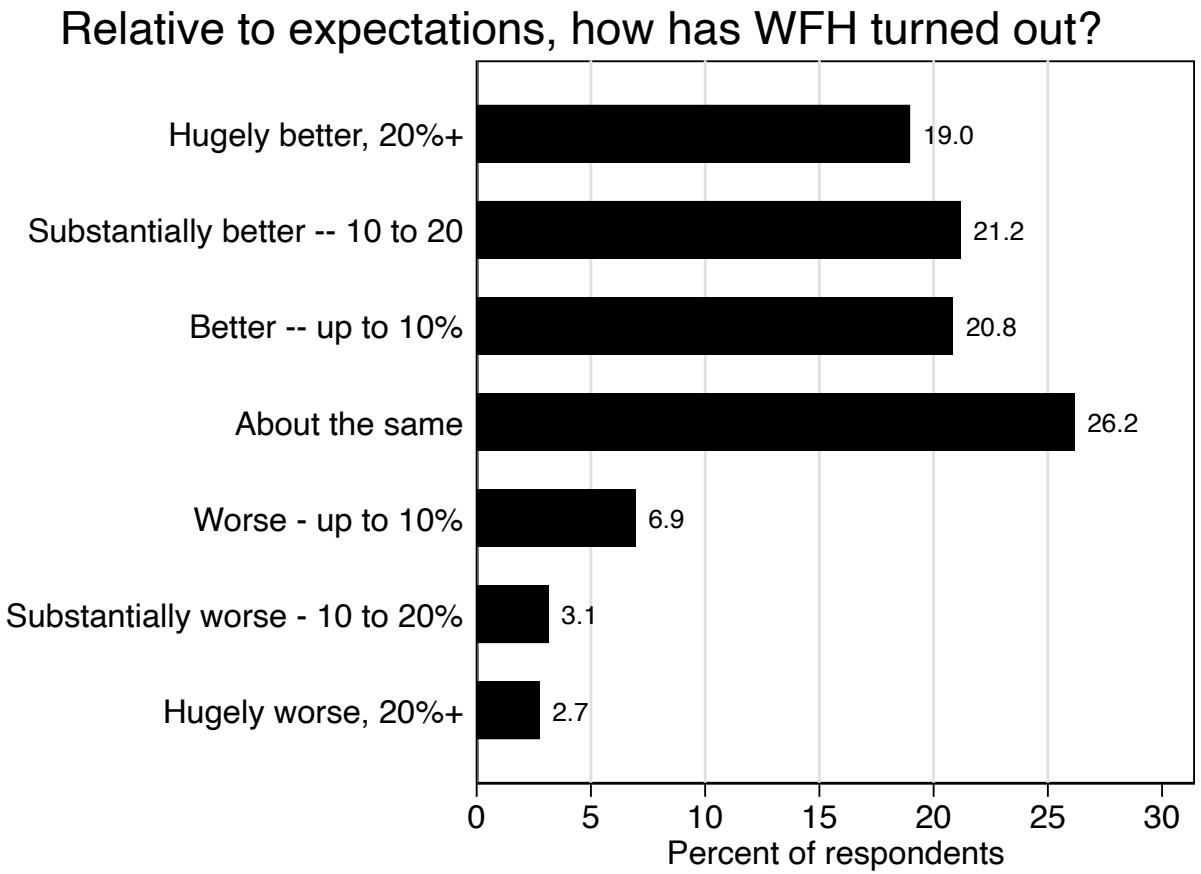
WFH stigma has diminished

Percent of respondents	Net change in WFH perception	(SE)	Positive change in WFH perception	(SE)
Overall	58.2	(0.7)	64.7	(0.5)
Women	57.9	(1.0)	64.3	(0.7)
Men	58.7	(1.0)	65.3	(0.8)
Age 20 to 29	61.1	(1.5)	68.4	(1.1)
Age 30 to 39	60.5	(1.2)	66.8	(1.0)
Age 40 to 49	59.6	(1.3)	65.8	(1.0)
Age 50 to 64	50.8	(1.5)	57.2	(1.2)
Less than high school	42.5	(10.0)	56.3	(6.9)
High school	41.7	(1.9)	49.8	(1.5)
1 to 3 years of college	55.4	(1.4)	61.1	(1.1)
4year college degree	65.2	(1.1)	70.5	(0.9)
Graduate degree	68.9	(1.3)	76.8	(0.9)

Percent of respondents	Net change in WFH perception	(SE)	Positive change in WFH perception	(SE)
Ann. Earnings of $20 to $50K	53.6	(1.2)	60.4	(0.9)
Ann. Earnings of $50 to $100K	62.4	(1.1)	68.4	(0.9)
Ann. Earnings of $100 to $150K	71.3	(1.7)	77.7	(1.2)
Ann. Earnings over $150K	76.2	(1.7)	83.3	(1.1)
Goods-producing sectors	50.3	(2.0)	59.4	(1.5)
Service sectors	59.6	(0.7)	65.7	(0.6)
No children	53.9	(1.0)	60.4	(0.8)
Living with children under 18	62.7	(0.9)	69.2	(0.7)
Red (Republican) state	56.0	(1.1)	63.7	(0.8)
Blue (Democratic) state	59.8	(0.9)	65.4	(0.7)

Notes: This table reports (1) the net change in perceptions about working from home, equal to the percent of respondents who report working from home perceptions have improved among some, most, or almost all the people the percent who report they have worsened; (2) the raw percent of respondents who report perceptions of working from home have improved. Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We reweight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

The WFH experience has exceeded expectations



Compared to your expectations ***before COVID (in 2019)*** how has working from home turned out for you?

- Hugely better -- I am 20%+ more productive than I expected
- Substantially better -- I am to 10% to 19% more productive than I expected
- Better -- I am 1% to 9% more productive than I expected
- About the same
- Worse -- I am 1% to 9% less productive than I expected
- Substantially worse -- I am to 10% to 19% less productive than I expected
- Hugely worse -- I am 20%+ less productive than I expected

Notes: Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Productivity surprise across demographics

Percent difference between WFH productivity and expectations	Mean	(SE)
Overall	7.1	(0.2)
Women	6.4	(0.3)
Men	8.0	(0.2)
Age 20 to 29	6.1	(0.4)
Age 30 to 39	7.6	(0.3)
Age 40 to 49	8.5	(0.3)
Age 50 to 64	5.5	(0.5)
Less than high school	2.5	(3.0)
High school	4.1	(0.7)
1 to 3 years of college	8.1	(0.5)
4year college degree	7.3	(0.3)
Graduate degree	7.3	(0.3)

Percent difference between WFH productivity and expectations	Mean	(SE)
Ann. Earnings of $20 to $50K	6.6	(0.4)
Ann. Earnings of $50 to $100K	7.1	(0.3)
Ann. Earnings of $100 to $150K	8.0	(0.4)
Ann. Earnings over $150K	10.5	(0.4)
Goods-producing sectors	8.6	(0.5)
Service sectors	6.9	(0.2)
No children	5.7	(0.3)
Living with children under 18	8.2	(0.2)
Red (Republican) state	6.9	(0.3)
Blue (Democratic) state	7.3	(0.2)

Notes: This table computes the average percent difference between productivity while working from home during COVID and their expected work-from-home productivity prior to the pandemic. Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We reweight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Investments enabling WFH

How many hours have you invested in learning how to work from home effectively (e.g., learning how to use video-conferencing software) and creating a suitable space to work?

- **Mean hours invested in learning to WFH: 13.0 (SE = 0.3)**

How much money have you and your employer invested in equipment or infrastructure to help you work from home effectively -- computers, internet connection, furniture, etc.?

- **Mean investment in equipment/infrastructure: $580 (SE = 18)**

What percentage of this expenditure has been reimbursed or paid by your employer?

- **Average fraction paid/reimbursed: 61.3% (SE = 0.6)**

Investment in WFH as % of GDP (employer $ + employees $ + hours)

1. For each respondent compute investment as % of monthly income
2. Earnings-weighted of 1. = **23.8% of monthly income**
3. Divide by 12 to get % of annual income
4. Multiply by .59 = (Employee Compensation/GDP) in 2019Q4

- Equipment investment = **0.51 (SE = 0.02) % of GDP**
- Total investment (hours + equipment) = **1.23 (SE = 0.03) % of GDP**

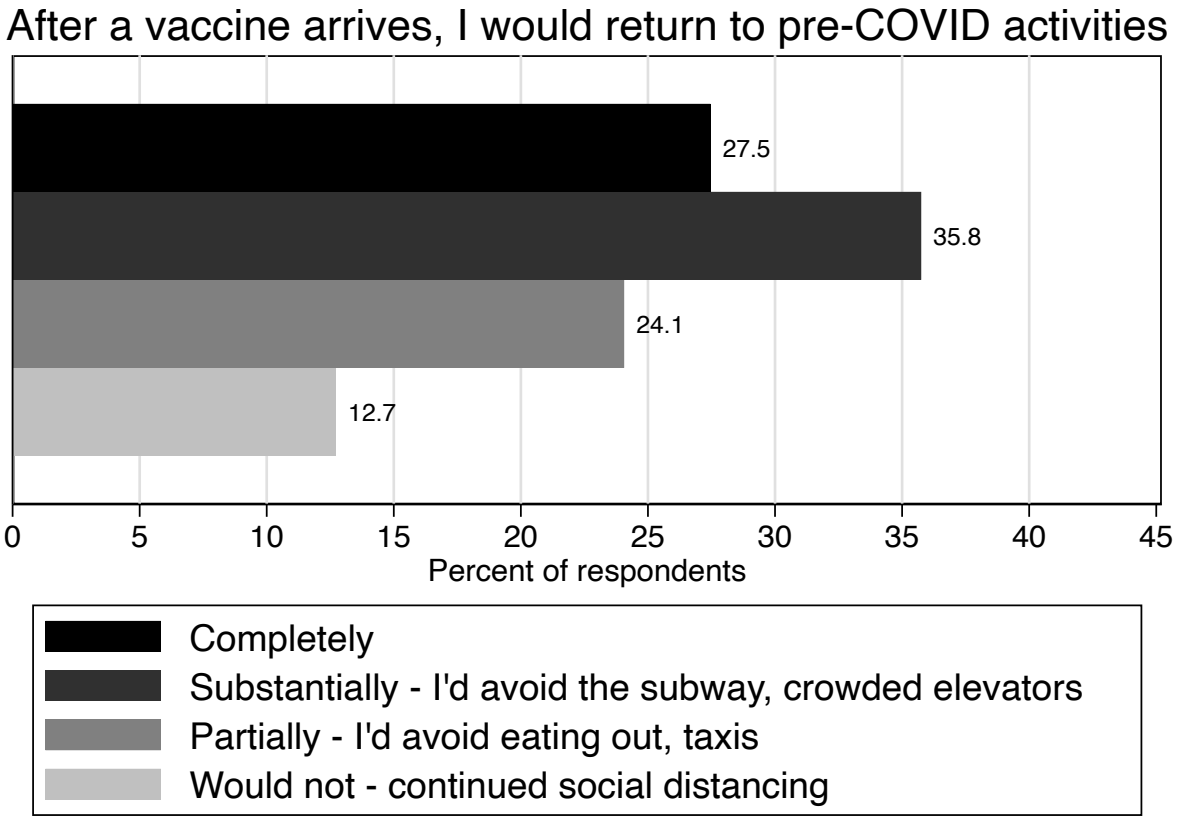
Investments enabling WFH

Average investment into WFH	Hours	(SE)	$ (employer + employee)	(SE)
Overall	13.0	(0.3)	580	(18)
Women	12.2	(0.4)	405	(22)
Men	13.9	(0.4)	795	(28)
Age 20 to 29	13.9	(0.7)	539	(38)
Age 30 to 39	13.7	(0.5)	685	(34)
Age 40 to 49	13.2	(0.6)	609	(34)
Age 50 to 64	10.2	(0.6)	397	(35)
Less than high school	18.2	(3.9)	403	(120)
High school	14.4	(1.3)	332	(43)
1 to 3 years of college	14.0	(0.7)	432	(32)
4year college degree	11.4	(0.4)	529	(28)
Graduate degree	13.6	(0.5)	873	(37)

Average investment into WFH	Hours	(SE)	$ (employer + employee)	(SE)
Ann. Earnings of $20 to $50K	12.4	(0.6)	392	(29)
Ann. Earnings of $50 to $100K	13.6	(0.5)	644	(30)
Ann. Earnings of $100 to $150K	13.5	(0.8)	898	(52)
Ann. Earnings over $150K	13.1	(0.7)	1209	(59)
Goods-producing sectors	11.3	(0.6)	687	(53)
Service sectors	13.3	(0.3)	563	(19)
No children	11.0	(0.4)	427	(24)
Living with children under 18	14.5	(0.4)	698	(25)
Red (Republican) State	13.4	(0.5)	539	(27)
Blue (Democratic) State	12.7	(0.4)	609	(24)

Notes: Average number of hours and dollars (paid by employer or employee) invested in enabling work from home duirng the pandemic. Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We reweight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Expectations: return to pre-COVID activities



If a COVID vaccine is discovered and made widely available, 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 way of things like riding the subway or getting into a crowded elevator
- Partial return to pre-COVID activities, but I would be way of many activities like eating out or using ride-share taxis
- No return to pre-COVID activities, as I will continue to social distance

Notes: Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

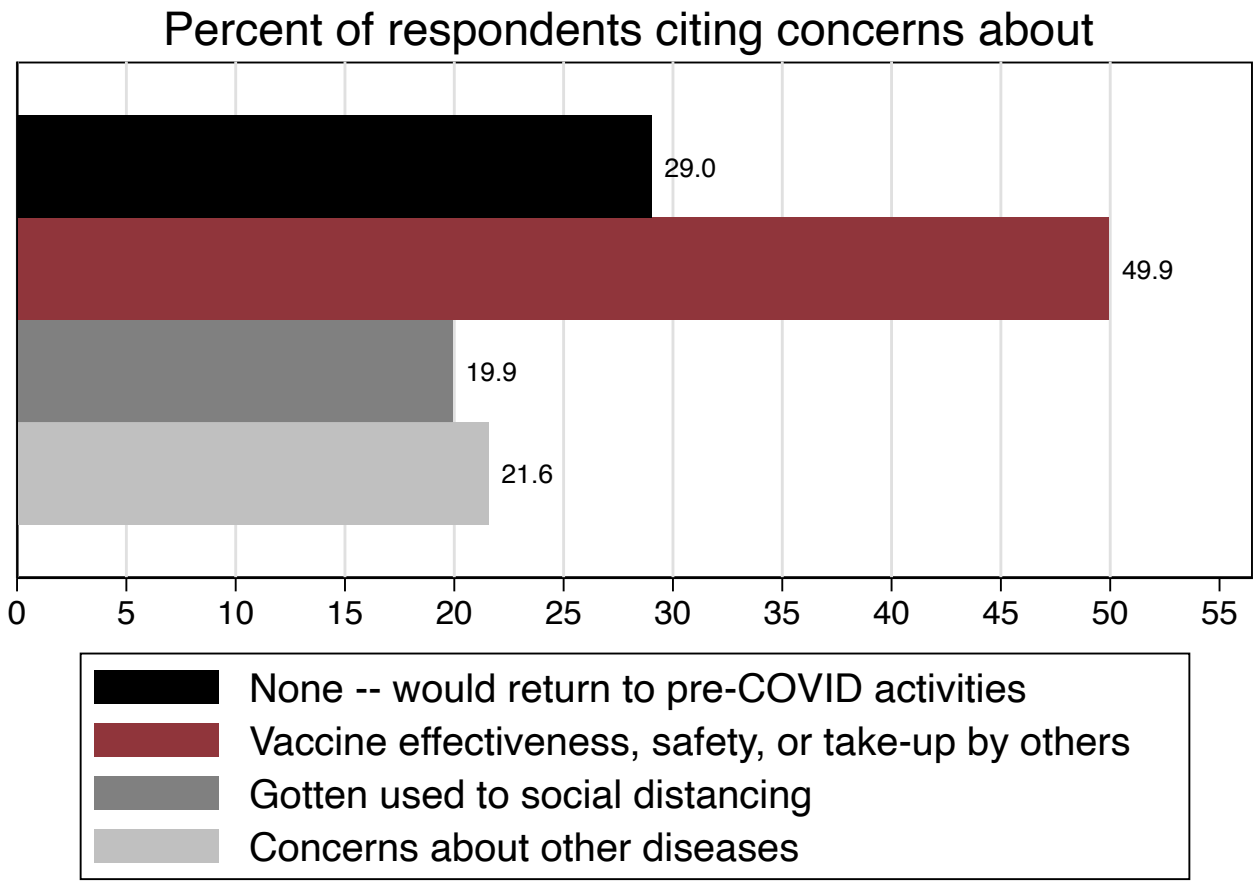
Expectations: return to pre-COVID activities

Percent of workers who would return to pre-COVID activities "completely"	Mean	(SE)
Overall	27.5	(0.5)
Women	21.4	(0.6)
Men	36.9	(0.8)
Age 20 to 29	22.7	(1.0)
Age 30 to 39	31.2	(0.9)
Age 40 to 49	32.7	(1.0)
Age 50 to 64	22.6	(1.0)
Less than high school	24.0	(5.9)
High school	29.1	(1.3)
1 to 3 years of college	24.2	(1.0)
4year college degree	22.3	(0.8)
Graduate degree	40.0	(1.0)

Percent of workers who would return to pre-COVID activities "completely"	Mean	(SE)
Ann. Earnings of $20 to $50K	25.5	(0.8)
Ann. Earnings of $50 to $100K	27.6	(0.8)
Ann. Earnings of $100 to $150K	35.0	(1.4)
Ann. Earnings over $150K	46.0	(1.5)
Goods-producing sectors	37.0	(1.5)
Service sectors	25.7	(0.5)
No children	24.6	(0.7)
Living with children under 18	30.5	(0.7)
Red (Republican) state	27.9	(0.8)
Blue (Democratic) state	27.1	(0.7)

Notes: This table computes the percent share of workers who would return to pre-COVID activities "completely" if a vaccine is found and made widely available. Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We reweight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Vaccine-related concerns are top of mind as it comes to the return to pre-COVID activities



You have stated that you ***would not return completely to pre-COVID activities***, if a COVID vaccine is discovered and made widely available. What ***reasons*** are behind your answer? Please check all that apply

- I am concerned about the **effectiveness or safety** of a COVID vaccine
- I am concerned about other potential diseases
- I have gotten used to social distancing, using e-commerce, and avoiding in-person goods and services
- Other (please describe)

Notes: Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

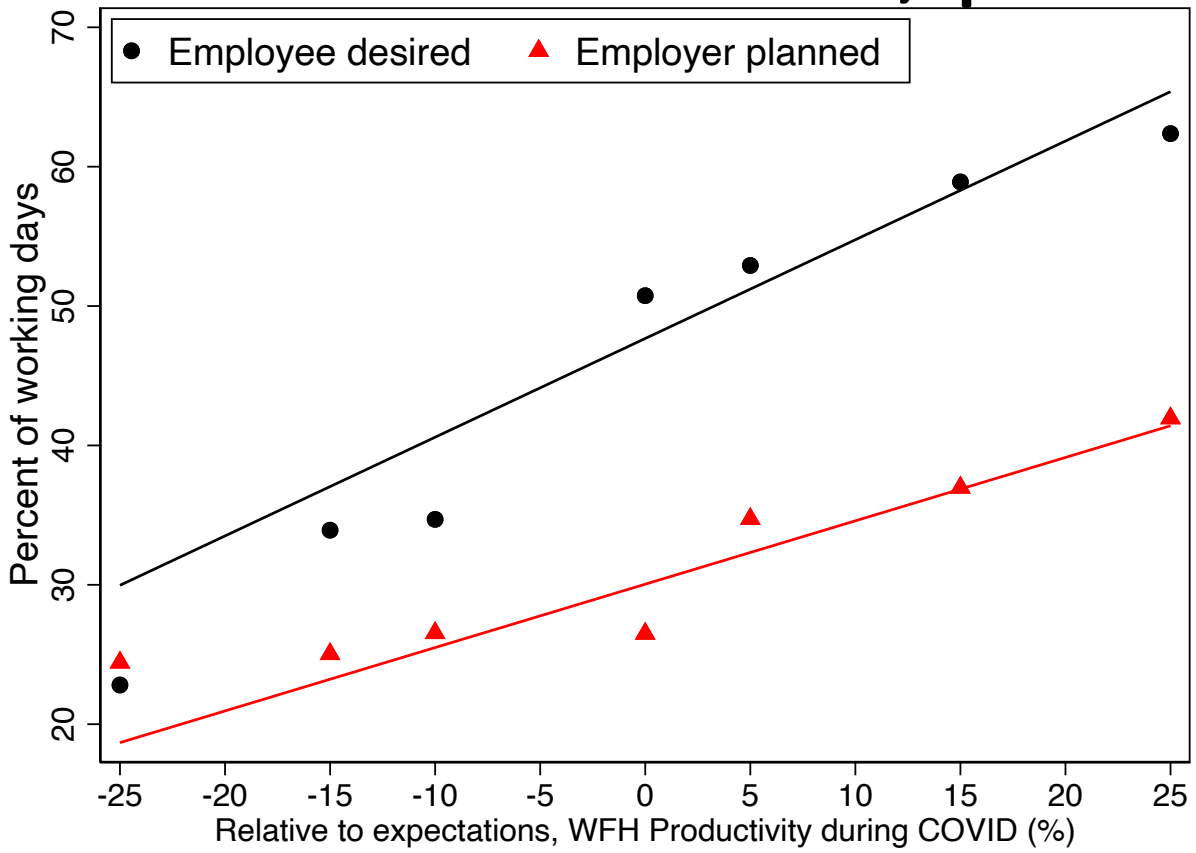
Vaccine concerns across demographics

Percent of respondents voicing concerns about vaccine safety, effectiveness, or take-up	Mean	(SE)
Overall	49.9	(1.1)
Women	59.5	(1.6)
Men	35.5	(1.4)
Age 20 to 29	53.5	(2.8)
Age 30 to 39	40.3	(2.0)
Age 40 to 49	48.1	(1.8)
Age 50 to 64	58.6	(2.2)
Less than high school	12.3	(8.0)
High school	43.6	(3.0)
1 to 3 years of college	57.8	(2.4)
4year college degree	54.4	(2.0)
Graduate degree	40.7	(1.7)

Percent of respondents voicing concerns about vaccine safety, effectiveness, or take-up	Mean	(SE)
Ann. Earnings of $20 to $50K	54.7	(2.0)
Ann. Earnings of $50 to $100K	46.1	(1.9)
Ann. Earnings of $100 to $150K	38.0	(2.4)
Ann. Earnings over $150K	35.8	(2.3)
Goods-producing sectors	35.6	(2.8)
Service sectors	52.8	(1.2)
No children	55.9	(1.7)
Living with children under 18	43.7	(1.4)
Red (Republican) state	52.8	(1.6)
Blue (Democratic) state	47.6	(1.4)

Notes: This table estimates the percent of respondents who are concerned about vaccine effectiveness, safety, or take-up. Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We reweight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Mechanisms consistent with WFH desire from workers, plans from employers



Notes: This figure estimates the percent share of days spent working from home post-COVID desired by employees and planned by their employers, as a function of how work from home productivity during COVID has turned out relative to expectations. Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

	Percent WFH days post-COVID (SE)			
Perceptions about WFH	**Employee desired**		**Employer planned**	
Improved among almost all (90 to 100%)	54.0	(0.9)	32.7	(0.9)
Improved among most	47.4	(0.8)	23.2	(0.8)
Improved among some	39.5	(1.1)	21.3	(1.0)
No change	38.0	(1.0)	15.1	(0.8)
Worsened among some	36.2	(2.2)	29.1	(2.4)
Worsened among most	38.4	(3.6)	26.8	(3.3)
Worsened among almost all (90 to 100%)	38.0	(4.3)	29.2	(4.1)

Notes: This table estimates the percent share of days spent working from home post-COVID desired by employees and planned by their employers, as a function of how the employee believes perceptions about working from home have changed. Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

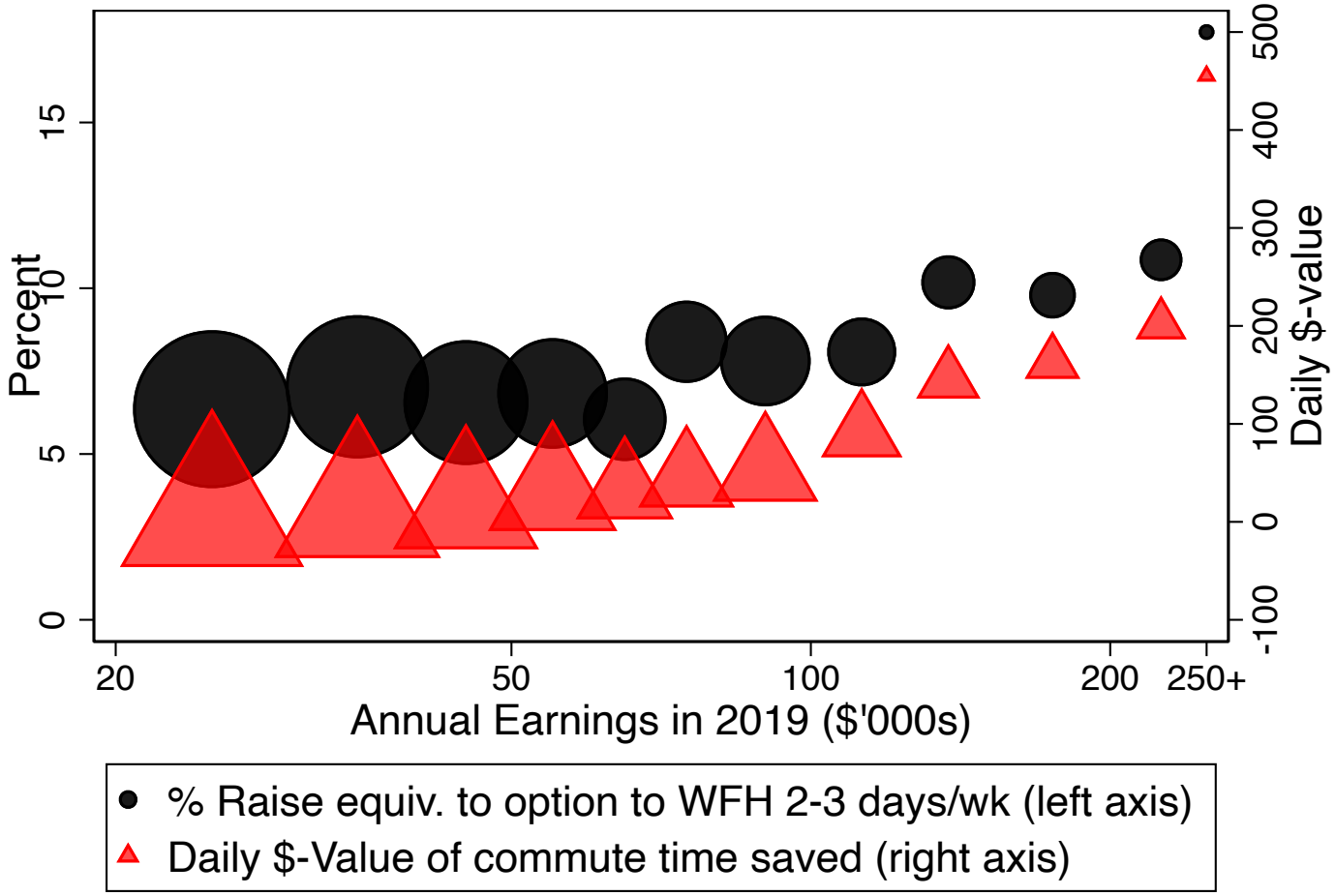
Network effects

- Discussion to be added
- Bloom, Davis and Zhestikova (2020) is relevant here.

Outline

- Survey and methodology
- The state of working from home
- The future of WFH
  - How much?
  - Why it will stick
- **Implications**
  - Effects on workers
  - Spatial reallocation of worker spending
  - Policy

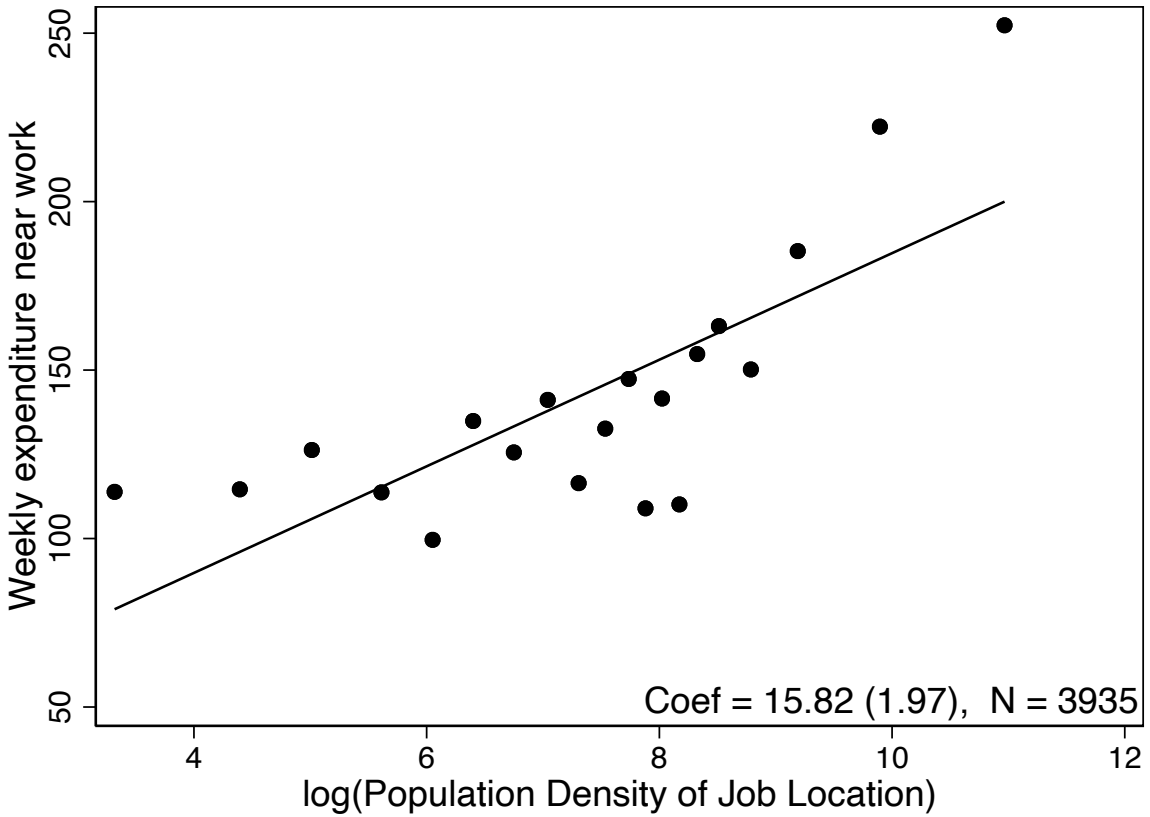
The WFH shift involves greater dollar-equivalent benefits at higher incomes

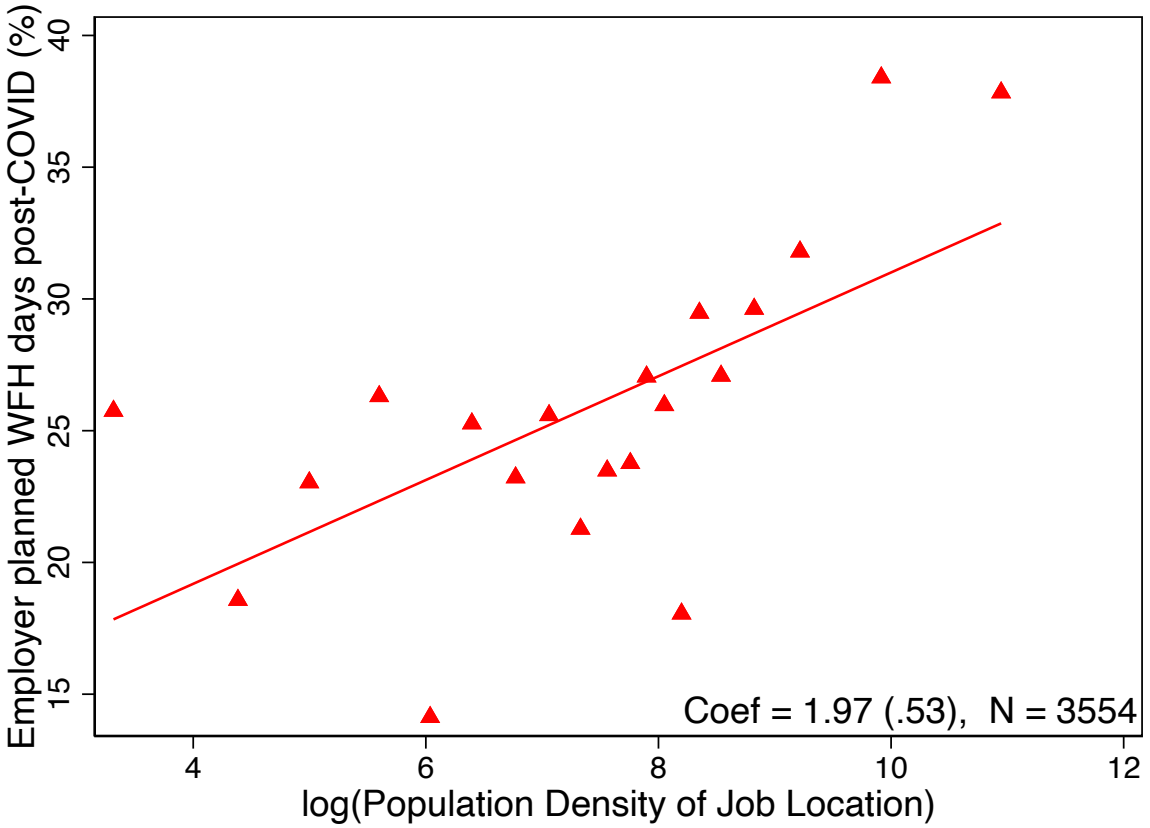


Note: Marker size is proportional to the number of respondents per income level.

Notes: Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Spending in business districts will decline





Notes: Data are from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each {industry x state x earnings} cell.

Approximate expenditure reduction in Manhattan

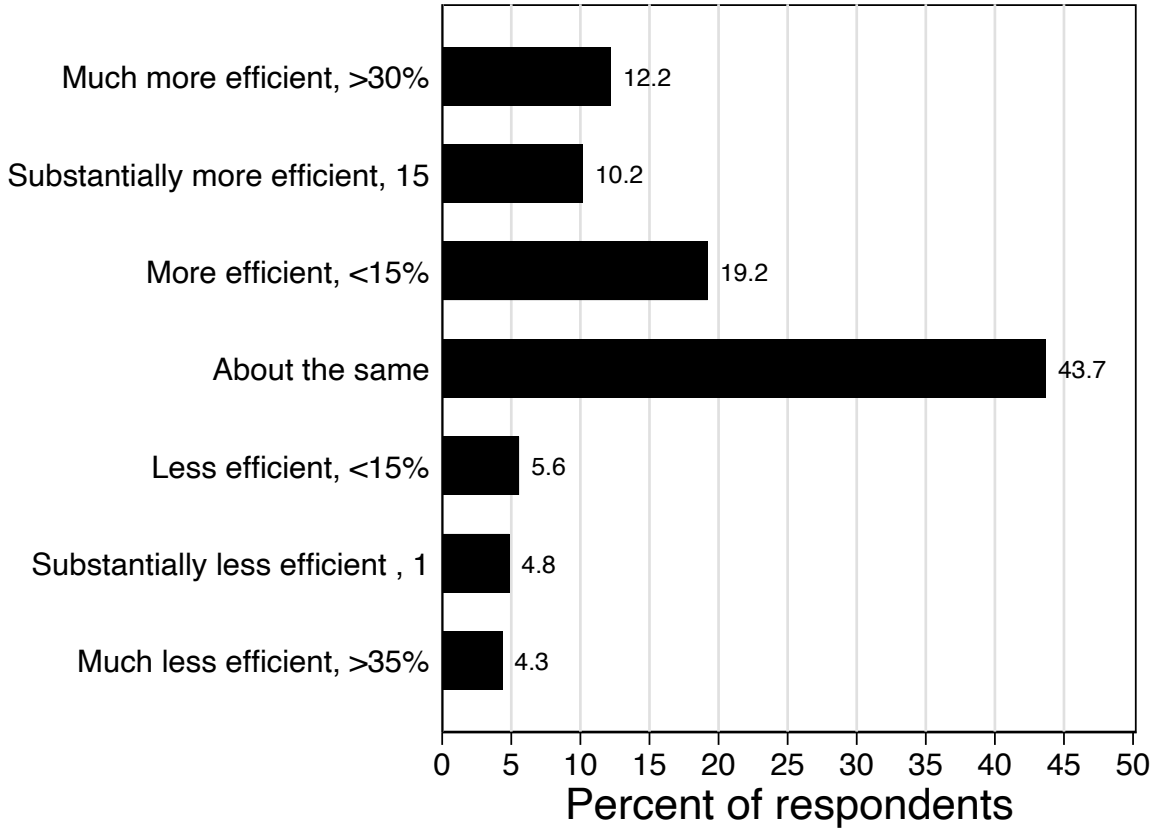
- Percent of planned days WFH for respondents who worked in Manhattan pre-COVID : 30.7%.
- Prior to COVID, average weekly expenditure near work by respondents who worked: ~$283
- Prior to COVID, ~2.3 million people commuted into Manhattan for work per day
- A 30% reduction in weekly expenditure by commuters amounts to:
  283*0.3 = $87 per worker per week.
- Annually, we obtain 87*50*2.3 million = $10 Billion lower spending in Manhattan.
- From March 2019 to Feb 2020, taxable sales in NYC were $181 Billion.

Approximate expenditure reduction in SF

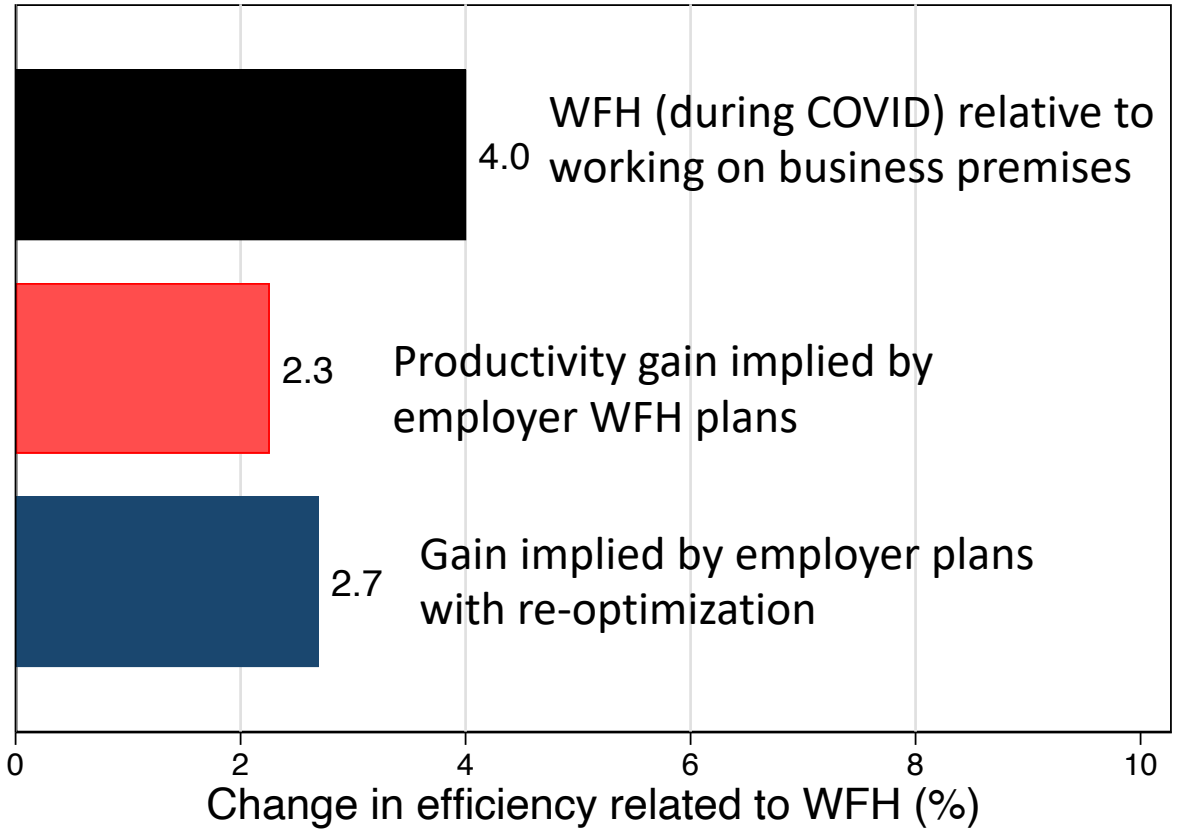
- Percent of planned days WFH for respondents who worked in SF pre-COVID: 59.5%.
- Prior to COVID, average weekly expenditure near work by respondents who worked in SF: ~$154
- Prior to COVID, ~0.2 million people commuted into SF for work per day
- A 60% reduction in weekly expenditure by commuters amounts to: 165*0.6 = $92 per worker per week.
- Annually, we obtain 92*50*0.2 million = $0.9 Billion lower spending in SF.
- In 2019, taxable sales in SF were $16.9 Billion.

Efficiency of WFH vs. Working on Business Premises

How does your efficiency working from home ***during the COVID-19 pandemic*** compare to your efficiency working on business premises ***before the pandemic?***



Relative WFH Efficiency and Implied Post-Pandemic Prod. Gain, Selection Adjusted and Earnings Weights



Notes: From August to October 2020, we surveyed 7,500 Americans aged 20-64 with labor earnings > $20,000 in 2019. We re-weight raw responses to match the industry-state-earnings shares of working-age persons in the CPS from 2010 to 2019. The right chart also uses responses to questions about employment status (selection), pay levels (for earnings weights) and, for the blue bar, how much their employer plans for them to work from home after the pandemic ends. **Source:** "Working from Home Will Stick" by Jose Maria Barrero, Nick Bloom and Steven J. Davis, October 2020.

Conclusion

- COVID-19 forced firms to experiment with WFH en-masse

- After COVID:
  - Workers desire ~40% of working days from home
  - Firms are planning ~20 to 25% of working days from home

- WFH will stick thanks to:
  - **Experimentation and learning** that shift the equilibrium
  - Diminished **stigma**
  - WFH turned out better than **expected for many**
  - **Lingering concerns about health risks in** a post-COVID world
  - **Investments** enabling WFH
  - **Network effects**

References

- Barrero, Jose Maria, Nick Bloom and Steven J. Davis, 2020. ”COVID-19 Is Also a Reallocation Shock,” *Brookings Papers on Economic Activity,* forthcoming.
- Bick, Alexander, Adam Blandin and Karel Mertens, 2020. “Work from Home after the COVID19 Outbreak,” Federal Reserve Bank of Dallas Working Paper 2017, June.
- Bloom, Davis and Zhestikova, 2020. “COVID-19 Shifted Patent Applications toward Technologies that Support Working from Home,” Becker Friedman Institute Working Paper, September.
- Brynjolfsson, Erik, John J. Horton, Adam Ozimek, Daniel Rock, Garima Sharma and Hong-Yi TuYe, 2020. “COVID-19 and Remote Work: An Early Look at U.S. Data,” NBER Working Paper 27344.
- Cicala, Steve, 2020. “Powering Work from Home.” NBER Working Paper 27937.
- Cutter, Chip, 2020. “What CEOs Really Think About Remote Work.” *Wall Street Journal,* 23 September.
- Hopkins, Jared S., 2020. “Ahead of Covid-19 Vaccine, Half of Americans Indicate Reluctance, WSJ/NBC Poll Finds.” *Wall Street Journal,* 15 October.