

Figures

Figure 1: Firm Age and Remote Work

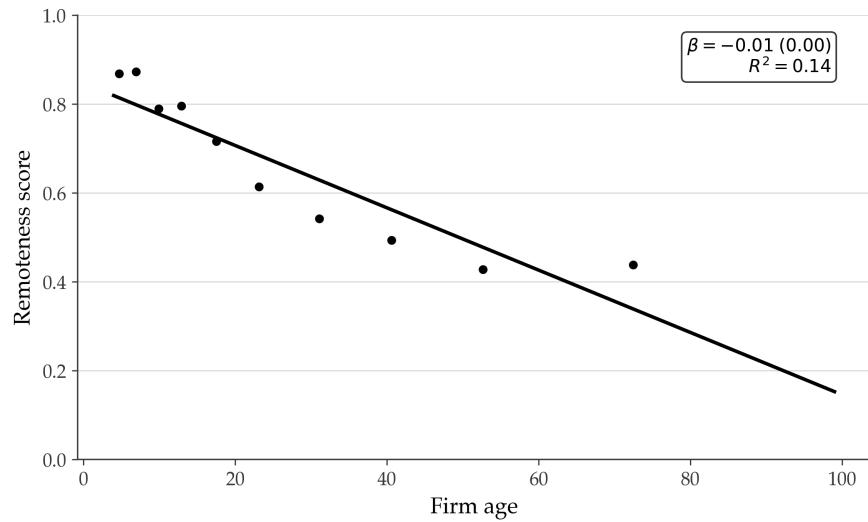


Figure 2: Telework Index and Remote Work

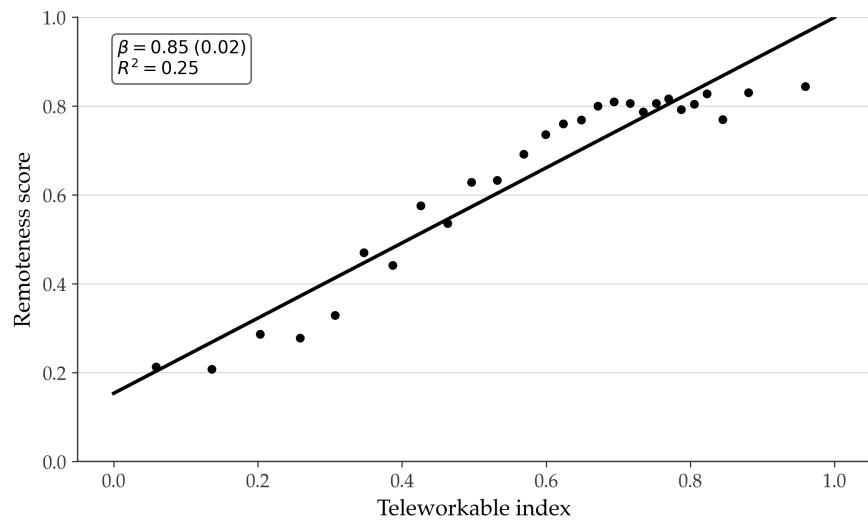
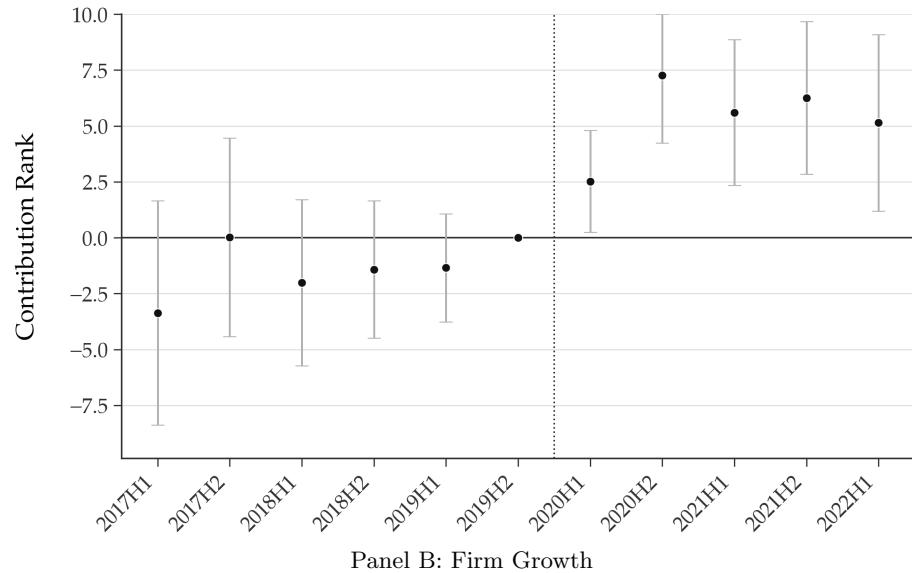


Figure 3: Event Study of Key Outcomes

Panel A: User Productivity



Panel B: Firm Growth

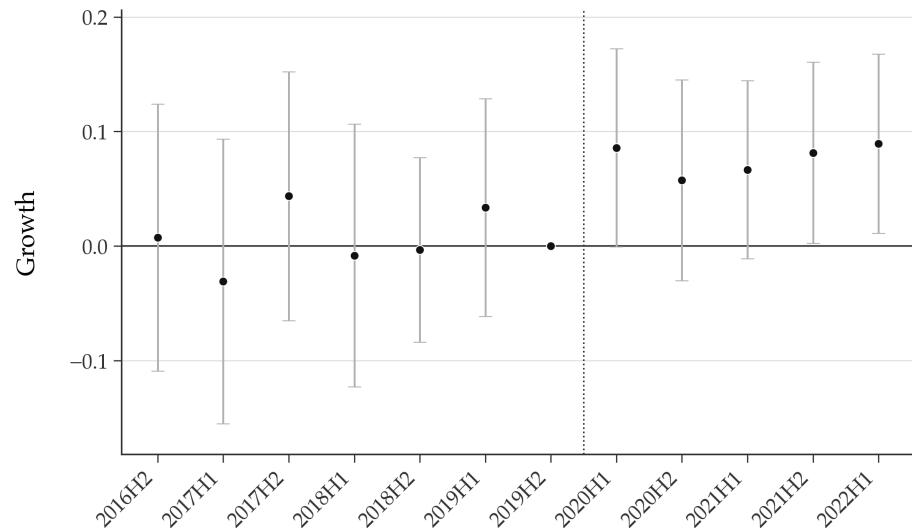
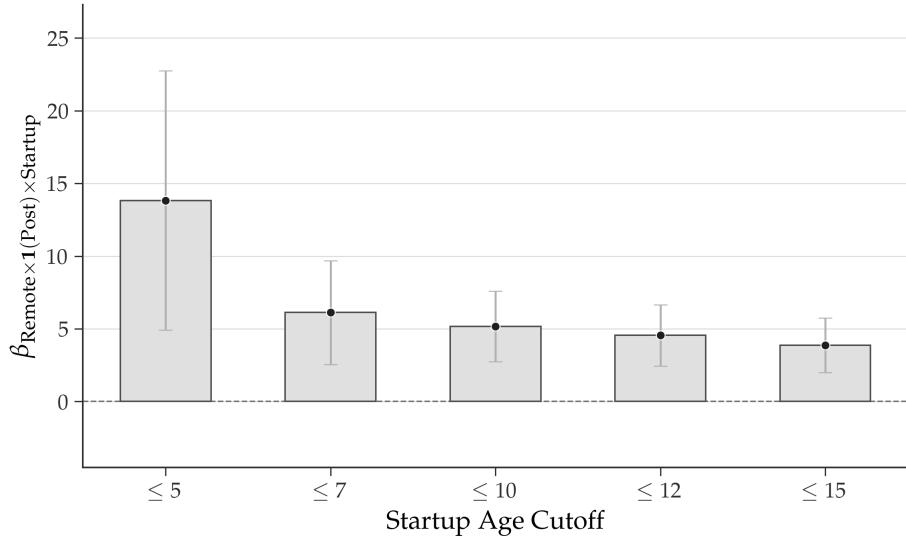


Figure 4: Startup Cutoff Visualization

Panel A: Contribution Rank (Total)



Panel B: Firm Growth Rate

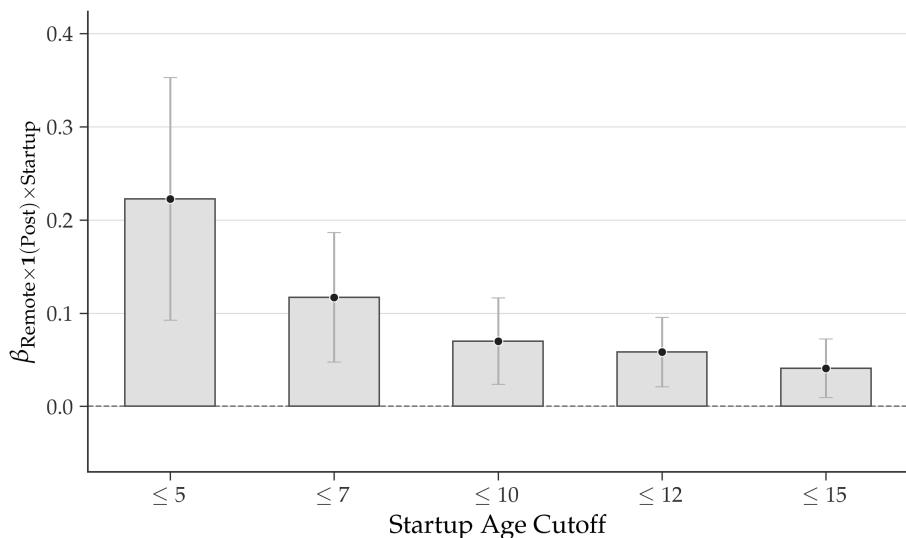
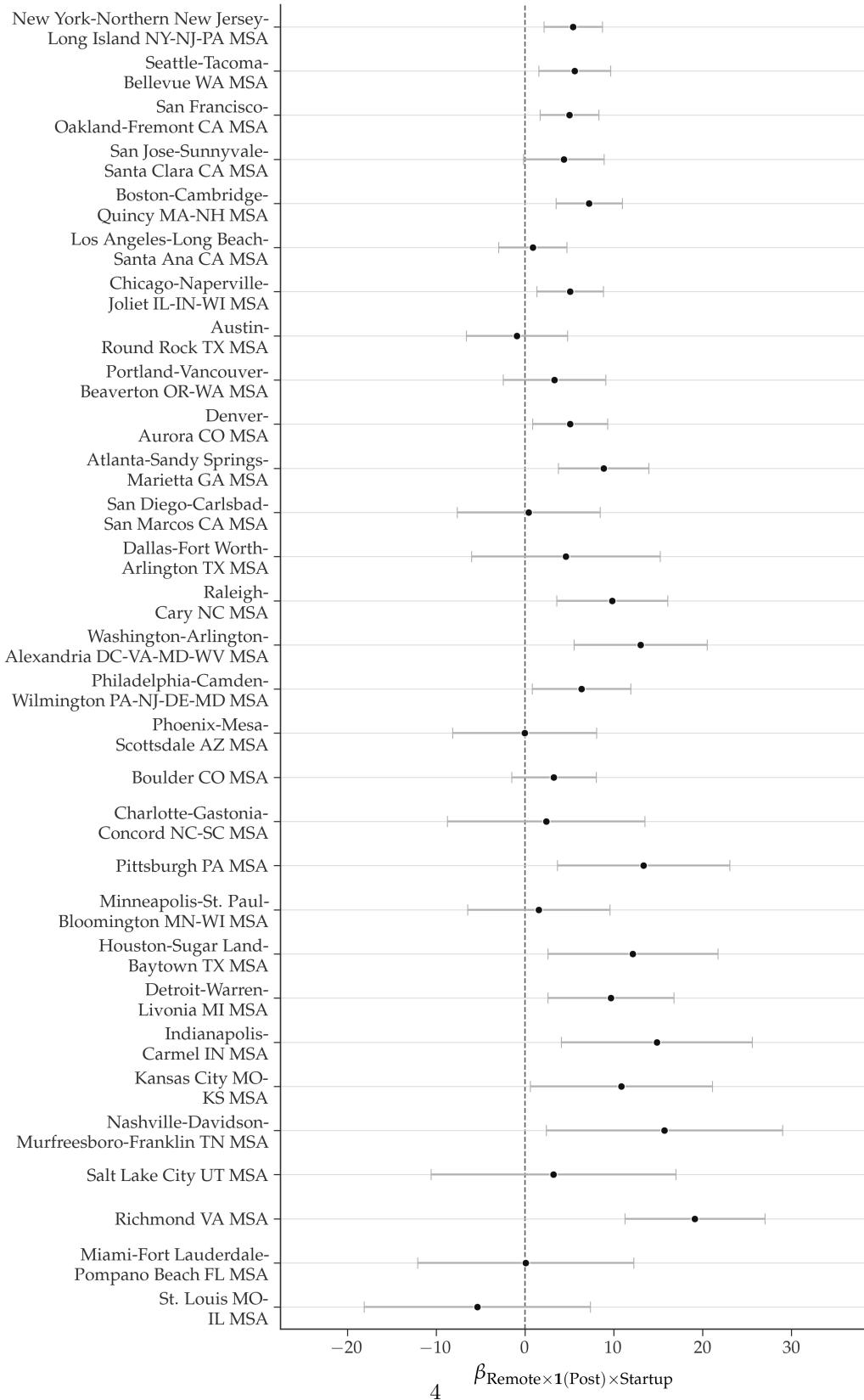


Figure 5: Remote Effect by Top Employment MSAs



Tables

Table 1: Summary Statistics

	Startup	Incumbent	All Firms
Panel A: Firm-level			
Growth	0.20 (0.31)	0.06 (0.16)	0.09 (0.22)
Leave	0.26 (0.31)	0.21 (0.28)	0.22 (0.29)
Join	0.35 (0.32)	0.17 (0.18)	0.22 (0.24)
Teleworkable Score (0–1)	0.67 (0.18)	0.54 (0.25)	0.57 (0.24)
Remote Score (0–1)	0.85 (0.30)	0.57 (0.41)	0.64 (0.40)
Employees (Count)	271 (1432)	2740 (9555)	2126 (8380)
Age	7 (2)	43 (34)	34 (33)
Rent (\$/sq ft)	49 (21)	37 (19)	40 (20)
Centrality Score	1419 (1830)	949 (1309)	1066 (1470)
Seniority Levels (Count)	3.62 (0.77)	3.86 (0.50)	3.80 (0.59)
Number of firms	878	2630	3508
Observations	10450	31530	41980
Panel B: Individual-level			
Total Contributions	362.95 (817.44)	192.73 (522.28)	225.70 (594.89)
Restricted Contributions	320.05 (746.65)	139.96 (359.56)	174.84 (466.14)
Number of firms	721	1503	2224
Number of individuals	8338	31993	37186
Observations	44801	186504	231305

Notes:

Table 2: Remote Work and Individual Productivity – OLS

	Contribution Rank			Total
	(1)	(2)	(3)	(4)
Panel A: OLS				
Remote $\times \mathbb{1}(\text{Post})$	-0.28 (0.44)	-1.03** (0.48)	-1.23** (0.50)	-19.74*** (4.66)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	–	5.18*** (1.24)	6.21*** (1.27)	59.23*** (14.22)
Pre-Covid Mean	49.92	49.92	49.92	184.71
N	229,862	229,862	224,708	224,708
Fixed Effects				
Time	✓	✓	✓	✓
Firm	✓	✓		
Individual	✓	✓		
Firm \times Individual			✓	✓

Notes:

Table 3: Remote Work and Individual Productivity – IV

	Contribution Rank			Total
	(1)	(2)	(3)	(4)
Panel B: IV				
Remote $\times \mathbb{1}(\text{Post})$	-3.61 (2.82)	-7.15* (3.90)	-9.26** (4.01)	-124.39*** (33.82)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	–	9.94* (5.37)	12.45** (5.39)	130.92** (55.14)
Pre-Covid Mean	49.92	49.92	49.92	184.71
KP rk Wald F	543.26	140.60	123.43	123.43
N	229,862	229,862	224,708	224,708
Fixed Effects				
Time	✓	✓	✓	✓
Firm	✓	✓		
Individual	✓	✓		
Firm \times Individual			✓	✓

Notes:

Table 4: Firm Scaling

	Growth		Join	Leave
	(1)	(2)	(3)	(4)
Panel A: OLS				
Remote $\times \mathbb{1}(\text{Post})$	0.01** (0.01)	0.00 (0.00)	0.01** (0.00)	0.02*** (0.00)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	–	0.07*** (0.02)	0.05* (0.03)	-0.01 (0.01)
Pre-Covid Mean	0.11	0.11	0.24	0.14
N	41,980	41,980	41,980	41,980
Panel B: IV				
Remote $\times \mathbb{1}(\text{Post})$	0.02* (0.01)	0.01 (0.01)	0.04*** (0.01)	0.05*** (0.01)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	–	0.21** (0.10)	0.23** (0.11)	0.09 (0.06)
KP rk Wald F	839.65	16.53	16.53	16.53
N	41,980	41,980	41,980	41,980
Fixed Effects				
Time	✓	✓	✓	✓
Firm	✓	✓	✓	✓

Notes:

Table 5: Job Posting Outcomes

	Postings _____ (1)	Hires/ Posting _____ (2)	Any Postings _____ (3)
Panel A: OLS			
Remote $\times \mathbb{1}(\text{Post})$	-0.91*** (0.23)	0.09 (0.08)	0.06*** (0.01)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	0.63** (0.27)	0.37* (0.22)	-0.02 (0.04)
Pre-Covid Mean	0.50	2.15	0.76
N	37,681	27,790	37,681
Panel B: IV			
Remote $\times \mathbb{1}(\text{Post})$	-3.58*** (0.61)	0.38** (0.17)	0.06** (0.02)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	1.60* (0.96)	2.16** (1.09)	0.23 (0.18)
KP rk Wald F	10.66	9.04	10.66
N	37,681	27,790	37,681
Fixed Effects			
Time	✓	✓	✓
Firm	✓	✓	✓

Notes:

Table 6: Individual Productivity Mechanisms

	Contribution Rank					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: OLS						
Remote $\times \mathbb{1}(\text{Post})$	-1.23** (0.50)	-0.95* (0.51)	-1.22** (0.50)	-1.19** (0.50)	-0.91* (0.52)	-1.21** (0.50)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	6.21*** (1.27)	4.03*** (1.26)	6.39*** (1.28)	6.15*** (1.28)	4.21*** (1.29)	6.24*** (1.29)
N	224,708	218,112	224,596	224,708	218,032	224,708
Panel B: IV						
Remote $\times \mathbb{1}(\text{Post})$	-9.26** (4.01)	-9.23* (4.87)	-9.72** (3.93)	-9.28** (4.12)	-10.13** (5.14)	-3.68 (3.88)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	12.45** (5.39)	11.76* (6.15)	14.94*** (5.62)	12.30** (5.52)	14.97** (6.91)	6.88 (5.65)
N	224,708	218,112	224,596	224,708	218,032	224,708
KP rk Wald F	123.43	81.62	130.14	117.48	74.32	134.89
Fixed Effects						
Time	✓	✓	✓	✓	✓	✓
Firm \times Individual	✓	✓	✓	✓	✓	✓
Controls						
Rent		✓				✓
HHI			✓			✓
Seniority				✓		✓
Firm Growth						✓

Notes:

Table 7: Fully Remote Versus Hybrid Productivity

Sample Filter	Contribution Rank			
	Hybrid		Hybrid / In-Person	
	(1)	(2)	(3)	(4)
Panel A: OLS				
$\mathbf{1}(\text{Remote}) \times \mathbf{1}(\text{Post})$	-0.97*** (0.32)	-0.76** (0.31)	-0.86*** (0.31)	-0.67** (0.30)
$\mathbf{1}(\text{Remote}) \times \mathbf{1}(\text{Post}) \times \text{Startup}$	2.97*** (0.72)	2.44*** (0.71)	3.39*** (0.71)	2.81*** (0.69)
Pre-Covid Mean	50.04	50.04	49.92	49.92
N	210,721	215,332	224,708	229,862
Panel B: IV				
$\mathbf{1}(\text{Remote}) \times \mathbf{1}(\text{Post})$	-3.72** (1.74)	-2.71* (1.64)	-4.11** (1.77)	-3.09* (1.68)
$\mathbf{1}(\text{Remote}) \times \mathbf{1}(\text{Post}) \times \text{Startup}$	4.37* (2.50)	3.39 (2.45)	5.61** (2.45)	4.38* (2.41)
KP rk Wald F	292.85	351.60	311.51	371.38
N	210,721	215,332	224,708	229,862
Fixed Effects				
Time	✓	✓	✓	✓
Firm		✓		✓
Individual		✓		✓
Firm \times Individual	✓		✓	

Notes:

Table 8: Productivity Heterogeneity by Worker Traits

	Contribution Rank	
	(1)	(2)
Panel A: OLS		
Remote $\times \mathbb{1}(\text{Post})$	-1.03** (0.48)	-1.23** (0.50)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Female}$	-2.54*** (0.62)	-2.18*** (0.66)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	5.18*** (1.24)	6.21*** (1.27)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Female} \times \text{Startup}$	3.49 (3.41)	6.42* (3.85)
Panel B: IV		
Remote $\times \mathbb{1}(\text{Post})$	-7.15* (3.90)	-9.26** (4.01)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Female}$	-2.75*** (0.72)	-2.37*** (0.77)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	9.94* (5.37)	12.45** (5.39)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Female} \times \text{Startup}$	5.67 (10.98)	21.98* (11.66)
Fixed Effects		
Time	✓	✓
Firm	✓	
Individual	✓	
Firm \times Individual		✓

Notes:

Table 9: Remote Work Outside Software and Hub Markets

Sample Filter	Contribution Rank		
	Drop NAICS	Drop SOC	Drop CA/NY
	(1)	(2)	(3)
Panel A: OLS			
Remote $\times \mathbb{1}(\text{Post})$	-1.16** (0.52)	-0.58 (0.70)	-0.85 (0.69)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	7.08*** (1.38)	6.47*** (1.89)	6.47*** (2.08)
Pre-Covid Mean	49.11	48.47	49.01
N	207,857	123,122	109,314
Panel B: IV			
Remote $\times \mathbb{1}(\text{Post})$	-10.47** (4.25)	-2.58 (5.17)	-12.70** (5.18)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	13.07** (5.63)	7.78 (7.45)	30.95*** (10.98)
KP rk Wald F	111.33	70.48	72.09
N	207,857	123,122	109,314
Fixed Effects			
Time	✓	✓	✓
Firm \times Individual	✓	✓	✓

Notes:

Table 10: Remote Work and Top CSA Filters (Firm \times Individual FE)

	Keep Top 5 CSAs (1)	Keep Top 10 CSAs (2)	Drop Top 5 CSAs (3)	Drop Top 10 CSAs (4)
Panel A: OLS				
Remote $\times \mathbb{1}(\text{Post})$	-1.54** (0.68)	-1.34** (0.57)	-0.58 (0.75)	-1.48 (1.00)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	5.59*** (1.64)	5.50*** (1.45)	7.44*** (2.16)	8.62*** (2.73)
Pre-Covid Mean	49.73	50.50	50.28	48.03
N	151,831	174,809	71,906	49,211
Panel B: IV				
Remote $\times \mathbb{1}(\text{Post})$	-4.43 (5.20)	-7.52 (9.92)	-14.02* (7.52)	-7.81** (3.45)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	-10.35 (15.95)	8.43 (10.91)	22.97*** (8.74)	13.06** (5.47)
Pre-Covid Mean	49.73	50.50	50.28	48.03
KP rk Wald F	9.60	20.76	26.29	185.42
N	151,831	174,809	71,906	49,211
Fixed Effects				
Time	✓	✓	✓	✓
Firm \times Individual	✓	✓	✓	✓

Notes: Reports the firm \times individual fixed-effect version of the worker-level regressions from Tables 2–3 under alternative geographic scopes. Columns (1) and (2) retain only firms headquartered in the top five or top ten CSAs, respectively, while columns (3) and (4) drop those CSAs. Panels A and B show the OLS and IV coefficients (instrumenting the remote interactions with their teleworkability counterparts), and every specification absorbs half-year fixed effects, includes the post \times startup main effect, and clusters standard errors by worker.

Table 11: Per-Employee Geographic Reach

	# States / Employee (1)	# MSAs / Employee (2)	# Locations / Employee (3)
Panel A: OLS			
Remote $\times \mathbb{1}(\text{Post})$	-0.012*** (0.003)	-0.004 (0.004)	0.008* (0.004)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	0.056*** (0.018)	0.048** (0.019)	0.060*** (0.018)
Pre-Covid Mean	0.156	0.234	0.475
N	41,959	41,959	41,959
Panel B: IV			
Remote $\times \mathbb{1}(\text{Post})$	-0.018** (0.007)	-0.002 (0.007)	0.031*** (0.009)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	-0.062 (0.081)	-0.061 (0.078)	0.032 (0.075)
Pre-Covid Mean	0.156	0.234	0.475
KP rk Wald F	16.40	16.40	16.40
N	41,959	41,959	41,959

Notes:

Table 12: Remote Work and Imputed Wages: Fixed-Effect Variants

	Log salary		
	(1)	(2)	(3)
Panel A: OLS			
Remote $\times \mathbb{1}(\text{Post})$	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	-0.00 (0.01)	-0.02** (0.01)	-0.00 (0.01)
Pre-Covid Mean	11.49	11.49	11.49
N	229,862	224,708	222,531
Panel B: IV			
Remote $\times \mathbb{1}(\text{Post})$	-0.01 (0.02)	0.03 (0.02)	0.08*** (0.01)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	-0.04 (0.03)	-0.05* (0.03)	-0.08*** (0.02)
KP rk Wald F	140.60	123.43	127.26
N	229,862	224,708	222,531
Fixed Effects			
Time	✓	✓	✓
Firm	✓		
Individual	✓		
Firm \times Individual		✓	✓
Title			✓

Notes:

Appendix

Tables

Table A1: First-Stage Diagnostics

	Remote $\times \mathbb{1}(\text{Post})$	Remote $\times \mathbb{1}(\text{Post})$ $\times \text{Startup}$		
Panel A: Individual-level				
Teleworkable $\times \mathbb{1}(\text{Post})$	0.23*** (0.01)	0.24*** (0.02)	-0.00* (0.00)	-0.00*** (0.00)
Teleworkable $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	0.16*** (0.02)	0.16*** (0.03)	0.39*** (0.02)	0.40*** (0.02)
$\mathbb{1}(\text{Post}) \times \text{Startup}$	0.09*** (0.02)	0.09*** (0.02)	0.60*** (0.01)	0.59*** (0.01)
Fixed Effects				
Time	✓	✓	✓	✓
Firm	✓		✓	
Individual	✓		✓	
Firm \times Individual		✓		✓
Partial F	325.46	295.11	186.55	175.46
KP rk Wald F	140.60	123.43	140.60	123.43
N	229,862	224,708	229,862	224,708
Panel B: Firm-level				
Teleworkable $\times \mathbb{1}(\text{Post})$	0.83*** (0.03)	—	-0.00 (0.00)	—
Teleworkable $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	-0.41*** (0.08)	—	0.41*** (0.07)	—
$\mathbb{1}(\text{Post}) \times \text{Startup}$	0.46*** (0.06)	—	0.58*** (0.05)	—
Fixed Effects				
Time	✓		✓	
Firm	✓		✓	
Partial F	437.86	—	16.54	—
KP rk Wald F	16.53	—	16.53	—
N	41,980	—	41,980	—

Notes:

Table A2: Remote Work and Restricted Contributions

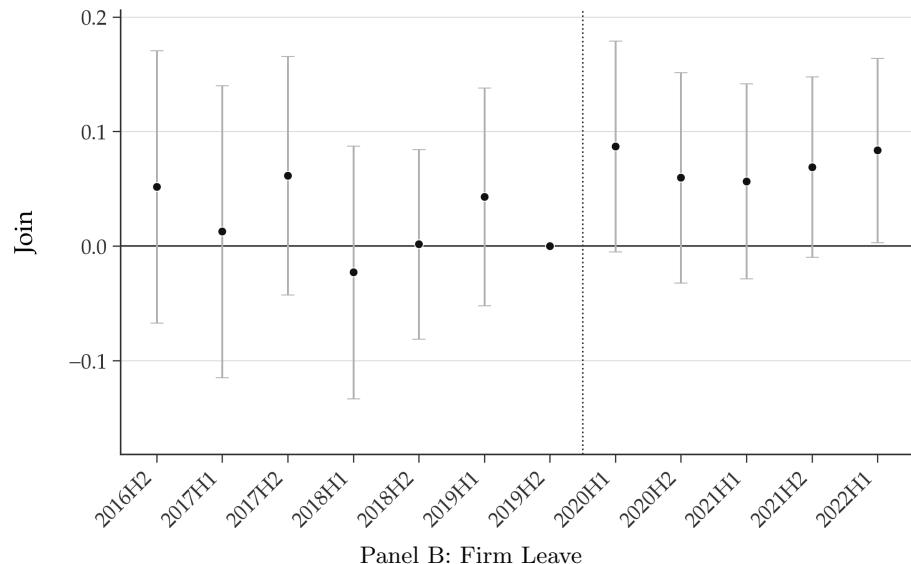
	Contribution Rank			Total
	(1)	(2)	(3)	(4)
Panel A: OLS				
Remote $\times \mathbb{1}(\text{Post})$	-0.51 (0.46)	-1.44*** (0.50)	-1.48*** (0.52)	-17.33*** (3.91)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	—	6.37*** (1.24)	7.31*** (1.27)	55.41*** (12.74)
Pre-Covid Mean	48.48	48.48	48.48	138.15
N	229,862	229,862	224,708	224,708
Panel B: IV				
Remote $\times \mathbb{1}(\text{Post})$	-3.36 (2.91)	-6.60 (4.08)	-6.75 (4.19)	-105.59*** (28.11)
Remote $\times \mathbb{1}(\text{Post}) \times \text{Startup}$	—	9.07* (5.43)	10.52* (5.42)	108.20** (48.92)
KP rk Wald F	543.26	140.60	123.43	123.43
N	229,862	229,862	224,708	224,708
Fixed Effects				
Time	✓	✓	✓	✓
Firm	✓	✓		
Individual	✓	✓		
Firm \times Individual			✓	✓

Notes:

Figures

Figure A1: Event Study of Labor Market Flows

Panel A: Firm Join



Panel B: Firm Leave

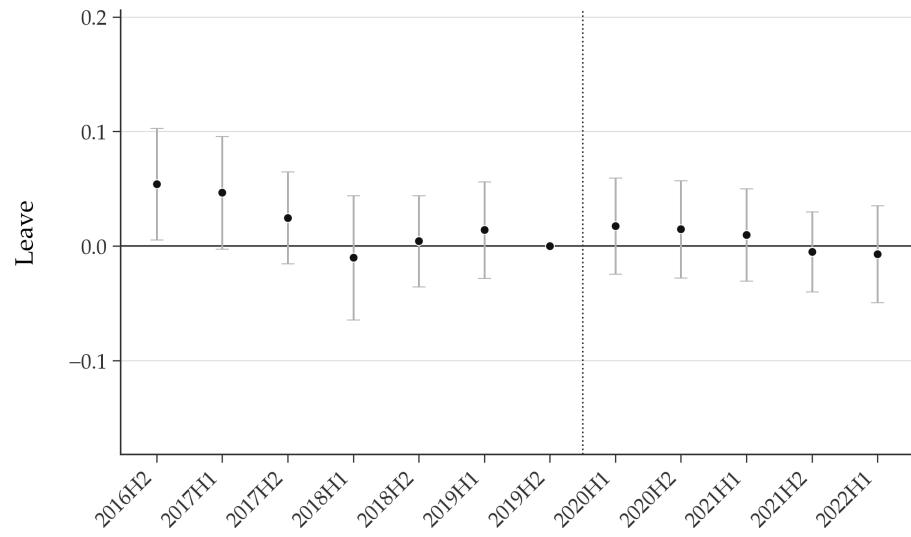
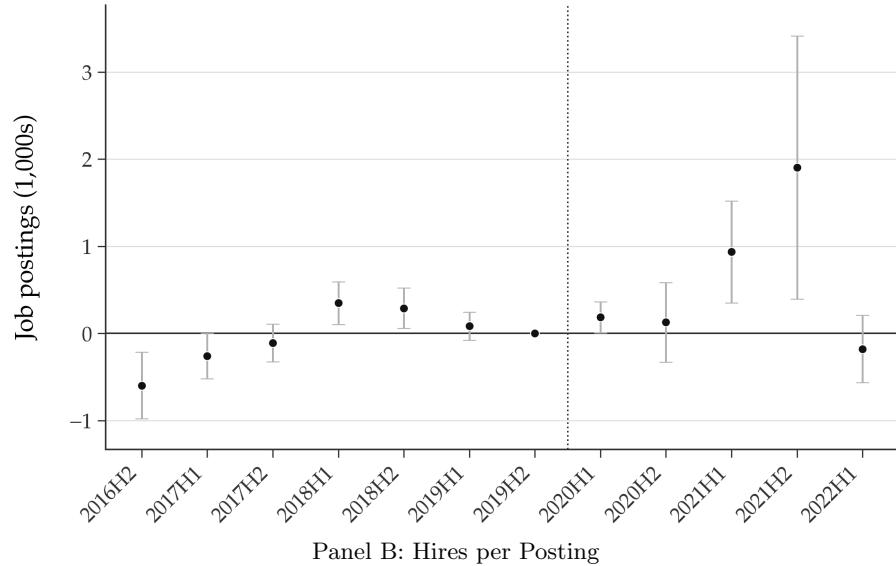


Figure A2: Event Study of Job Postings and Fill Rates

Panel A: Job Postings



Panel B: Hires per Posting

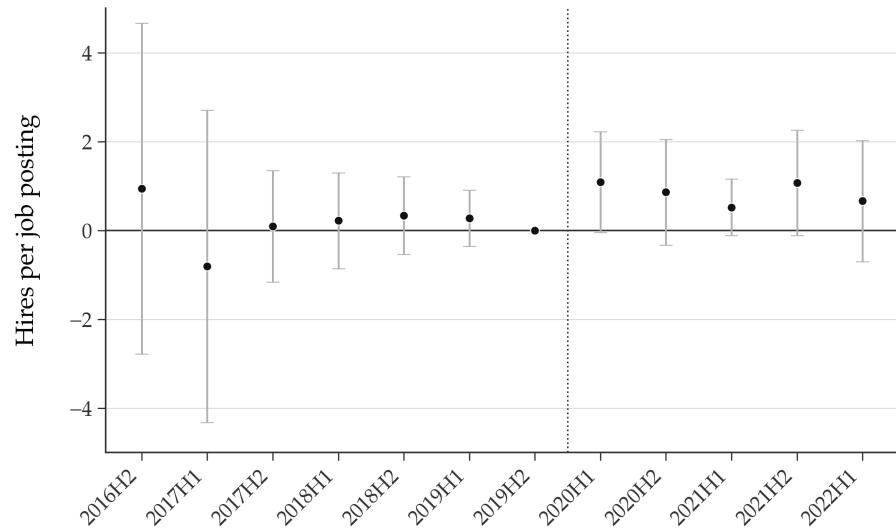
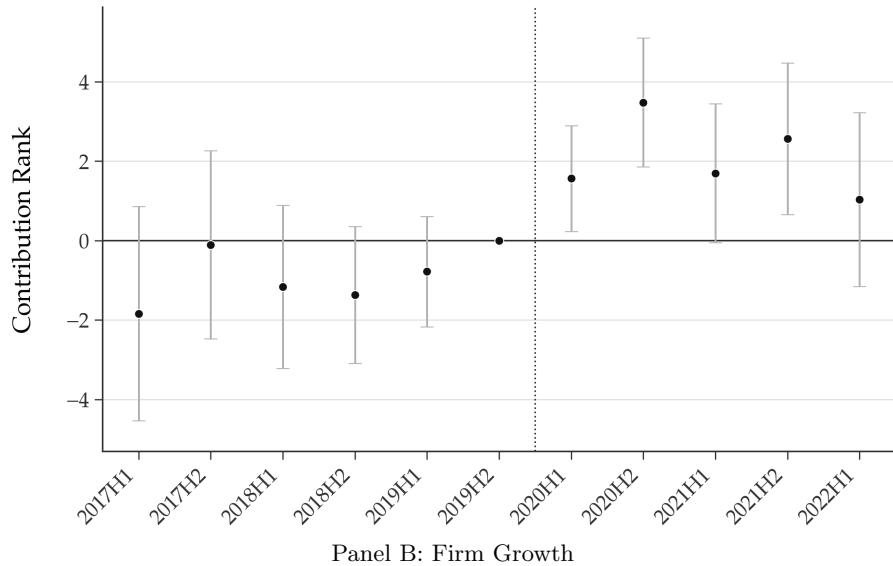


Figure A3: Event Study of Fully Remote Key Outcomes

Panel A: User Productivity



Panel B: Firm Growth

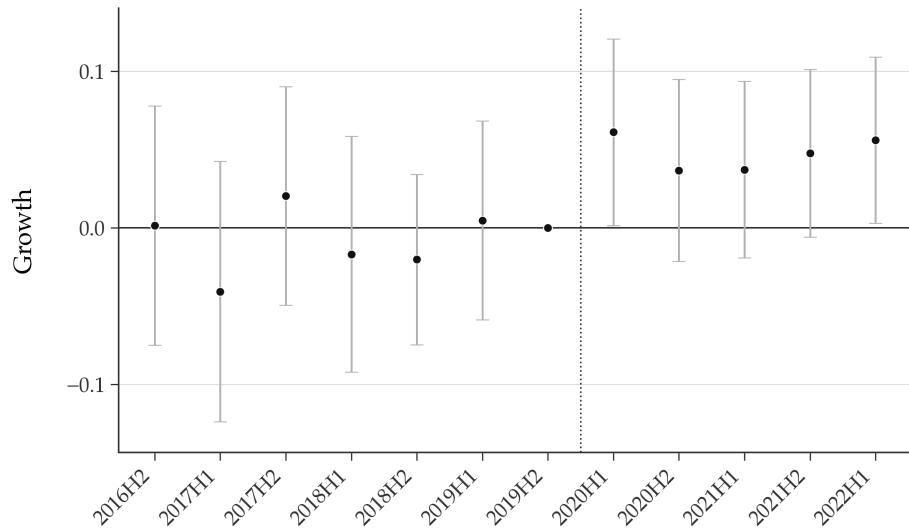
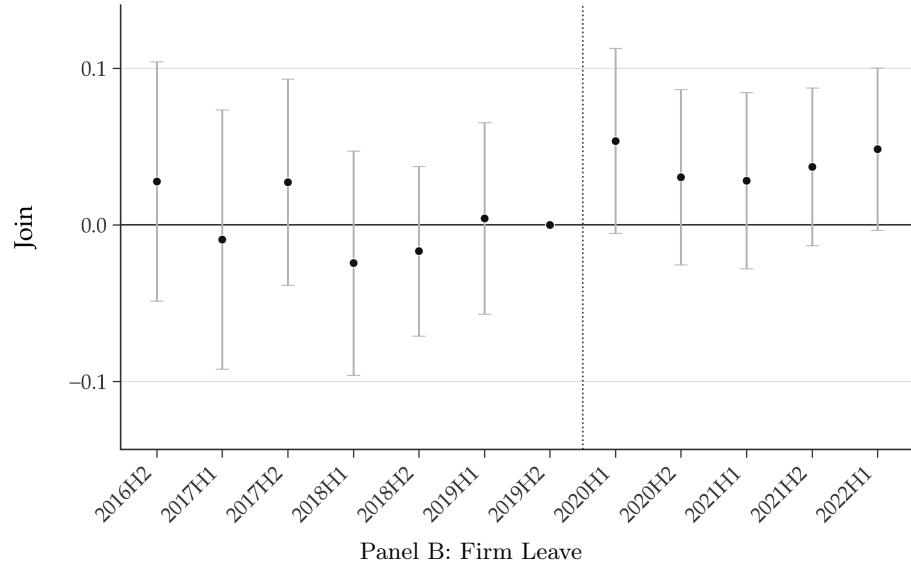


Figure A4: Event Study of Fully Remote Labor Flows

Panel A: Firm Join



Panel B: Firm Leave

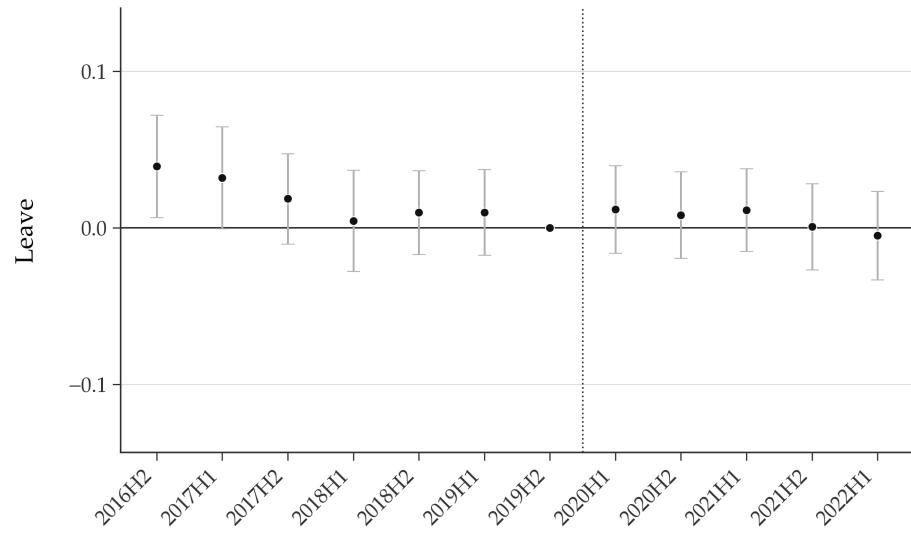
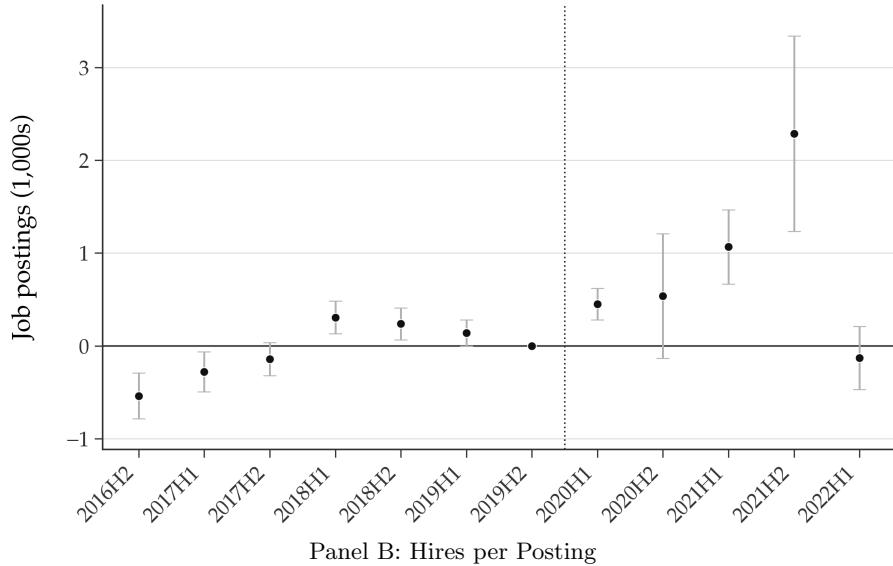


Figure A5: Event Study of Fully Remote Hiring Channels

Panel A: Job Postings



Panel B: Hires per Posting

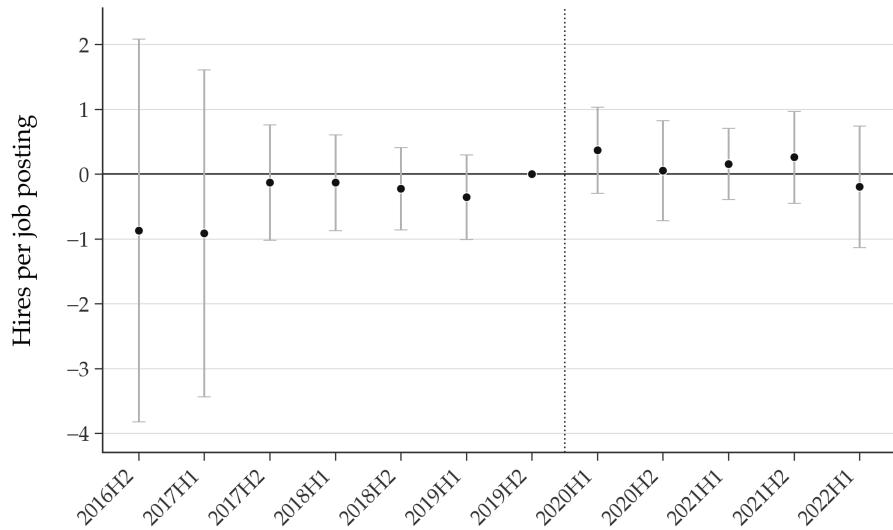
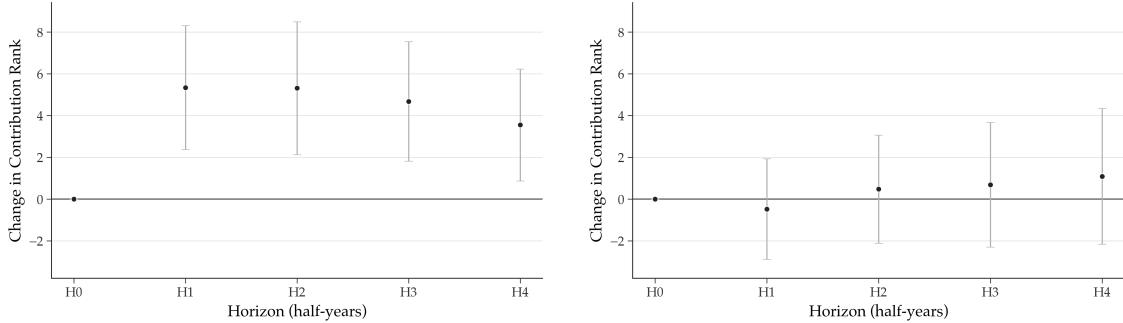


Figure A6: Impulse Responses

Panel A: Hybrid/In-person



Panel B: Fully Remote

