

Figures

Figure 1: Firm Age and Remote Work

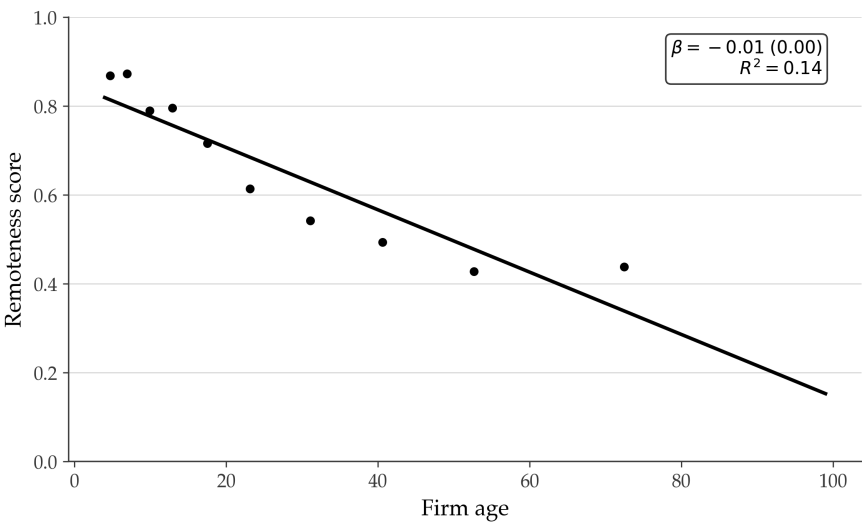


Figure 2: Telework Index and Remote Work

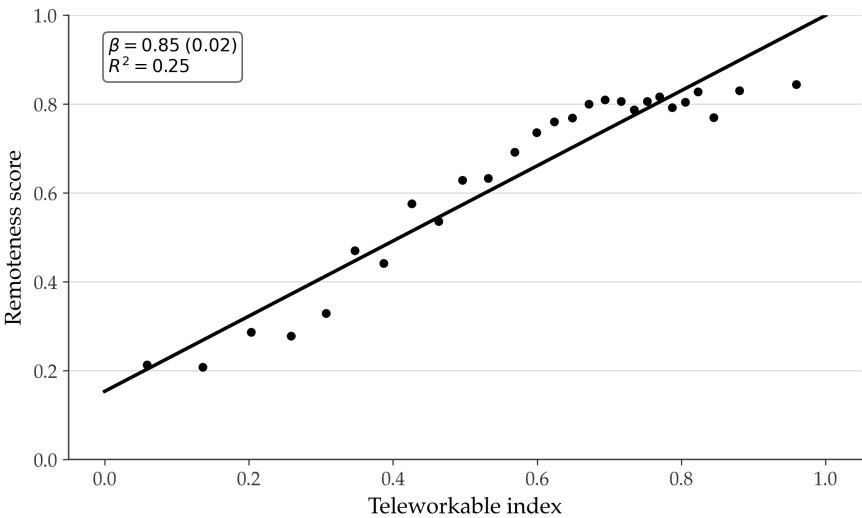
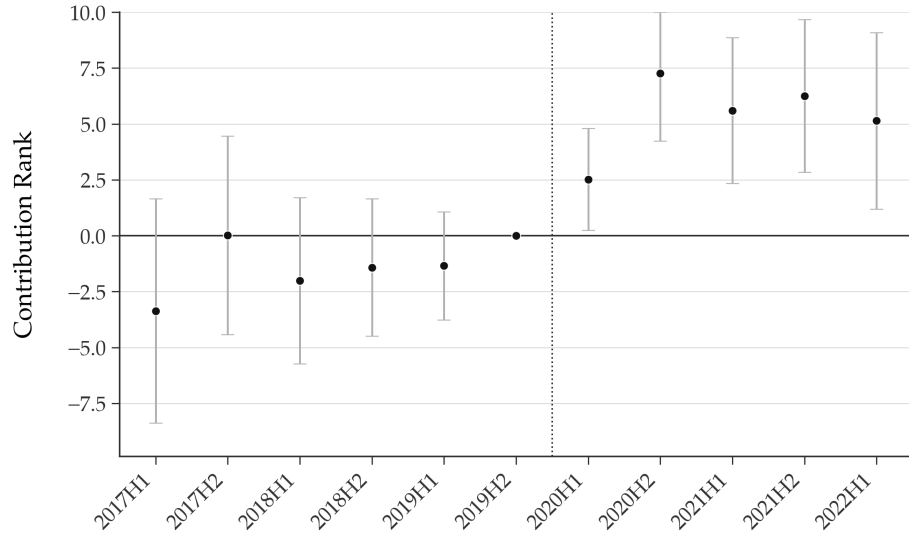


Figure 3: Event Study of Key Outcomes

Panel A: User Productivity



Panel B: Firm Growth

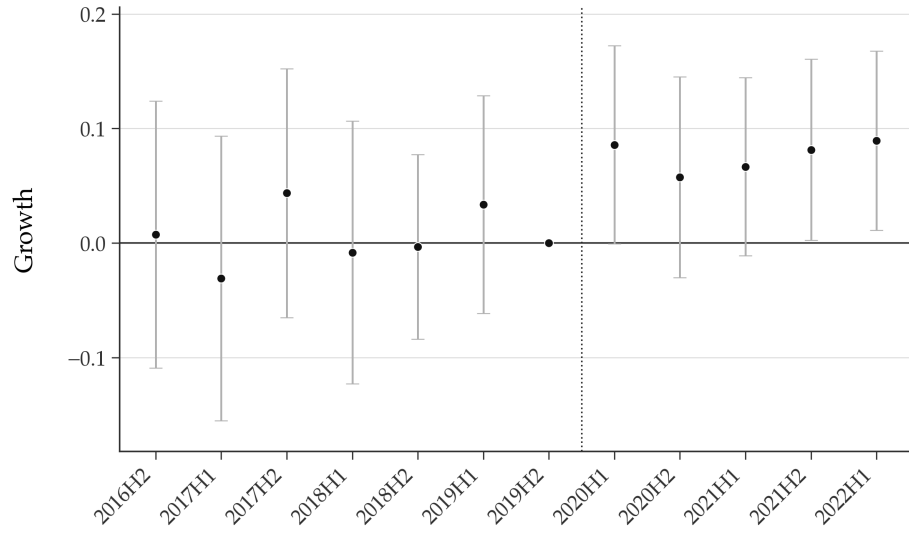
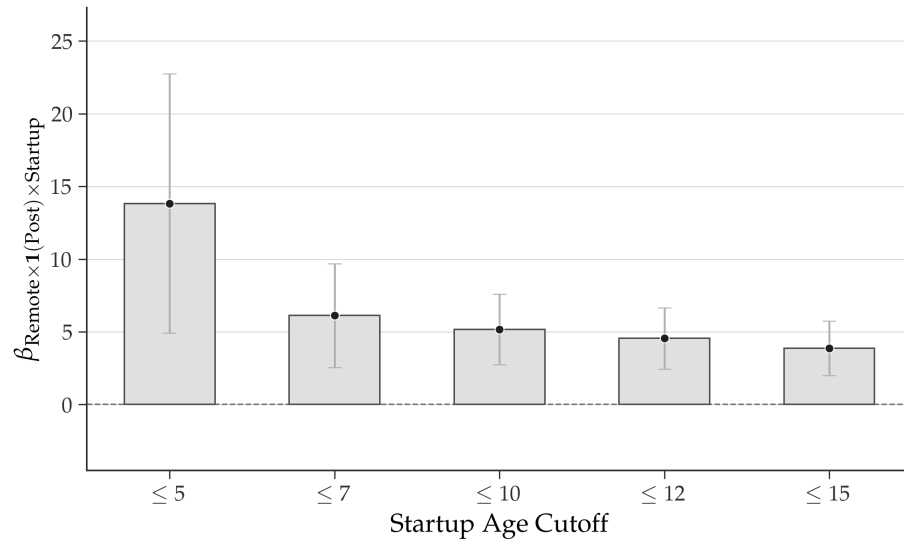


Figure 4: Startup Cutoff Visualization

Panel A: Contribution Rank (Total)



Panel B: Firm Growth Rate

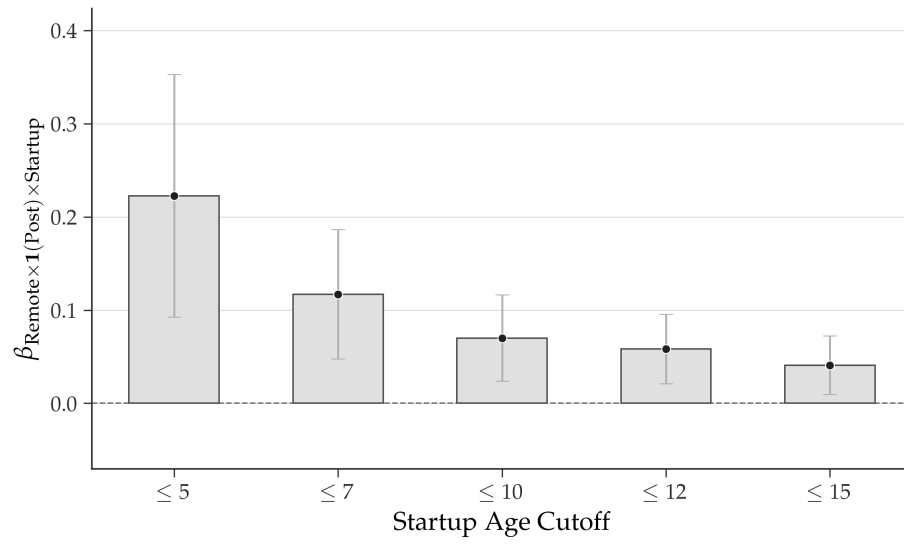
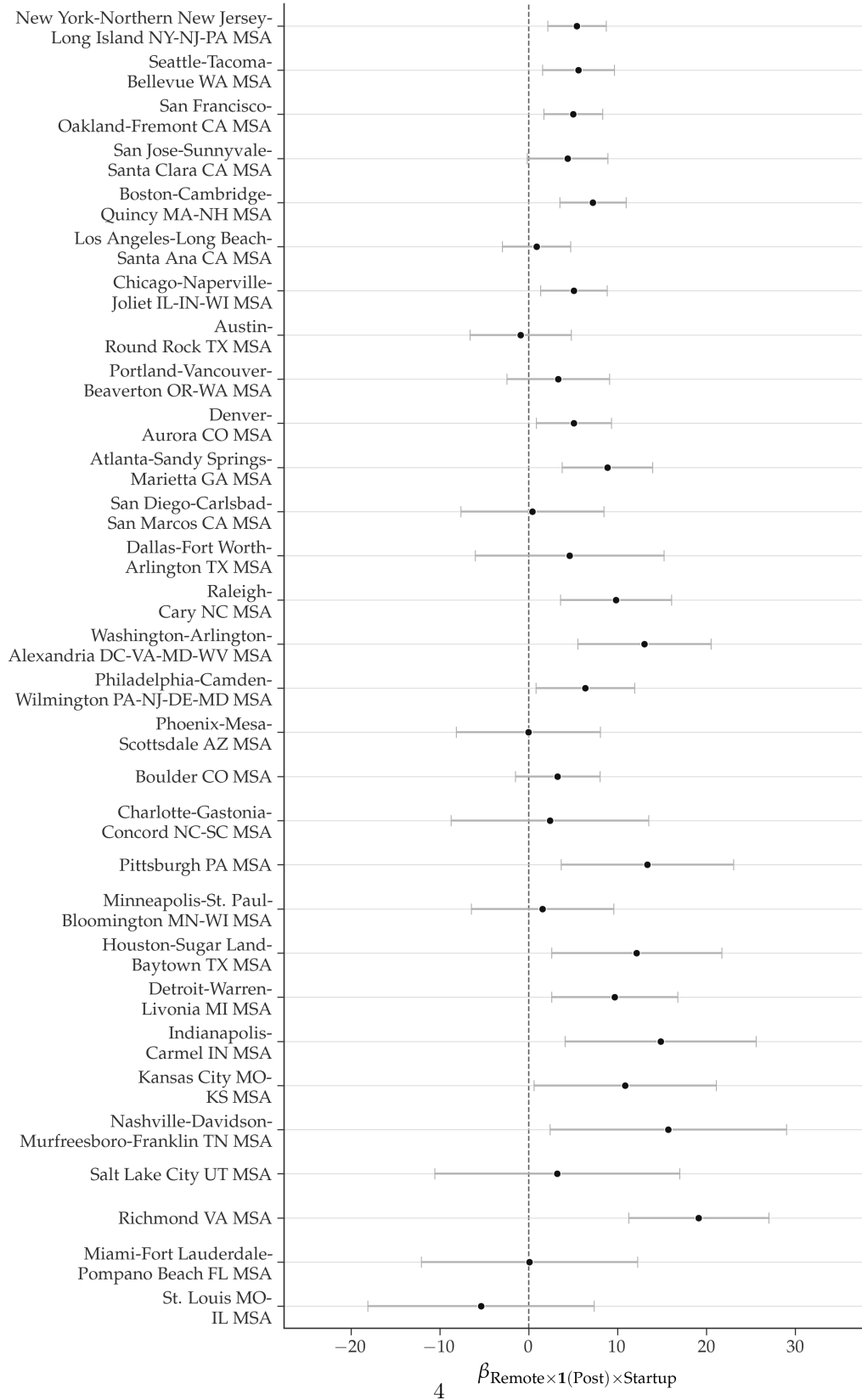


Figure 5: Remote Effect by Top Employment MSAs



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 1(Post)	-0.28 (0.44)	-1.03** (0.48)	-1.23** (0.50)	-19.74*** (4.66)
Remote \times 1(Post) \times 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 1(Post)	-3.61 (2.82)	-7.15* (3.90)	-9.26** (4.01)	-124.39*** (33.82)
Remote \times 1(Post) \times 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 1(Post)	0.01** (0.01)	0.00 (0.00)	0.01** (0.00)	0.02*** (0.00)
Remote \times 1(Post) \times 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 1(Post)	0.02* (0.01)	0.01 (0.01)	0.04*** (0.01)	0.05*** (0.01)
Remote \times 1(Post) \times 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 1(Post)	-0.91*** (0.23)	0.09 (0.08)	0.06*** (0.01)
Remote \times 1(Post) \times 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 1(Post)	-3.58*** (0.61)	0.38** (0.17)	0.06** (0.02)
Remote \times 1(Post) \times 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 1(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 1(Post) \times 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 1(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 1(Post) \times 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				
$\mathbb{1}(\text{Remote}) \times \mathbb{1}(\text{Post})$	-0.97*** (0.32)	-0.76** (0.31)	-0.86*** (0.31)	-0.67** (0.30)
$\mathbb{1}(\text{Remote}) \times \mathbb{1}(\text{Post}) \times \text{Startup}$	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				
$\mathbb{1}(\text{Remote}) \times \mathbb{1}(\text{Post})$	-3.72** (1.74)	-2.71* (1.64)	-4.11** (1.77)	-3.09* (1.68)
$\mathbb{1}(\text{Remote}) \times \mathbb{1}(\text{Post}) \times \text{Startup}$	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 1(Post)	-1.03** (0.48)	-1.23** (0.50)
Remote \times 1(Post) \times Female	-2.54*** (0.62)	-2.18*** (0.66)
Remote \times 1(Post) \times Startup	5.18*** (1.24)	6.21*** (1.27)
Remote \times 1(Post) \times Female \times Startup	3.49 (3.41)	6.42* (3.85)
Panel B: IV		
Remote \times 1(Post)	-7.15* (3.90)	-9.26** (4.01)
Remote \times 1(Post) \times Female	-2.75*** (0.72)	-2.37*** (0.77)
Remote \times 1(Post) \times Startup	9.94* (5.37)	12.45** (5.39)
Remote \times 1(Post) \times Female \times 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	Drop Top 5 CSAs	Drop Top 10 CSAs
	(1)	(2)	(3)	(4)	(5)
Panel A: OLS					
Remote \times 1(Post)	-1.16** (0.52)	-0.58 (0.70)	-0.85 (0.69)	-0.58 (0.75)	-1.48 (1.00)
Remote \times 1(Post) \times Startup	7.08*** (1.38)	6.47*** (1.89)	6.47*** (2.08)	7.44*** (2.16)	8.62*** (2.73)
Pre-Covid Mean	49.11	48.47	49.01	50.28	48.03
N	207,857	123,122	109,314	71,906	49,211
Panel B: IV					
Remote \times 1(Post)	-10.47** (4.25)	-2.58 (5.17)	-12.70** (5.18)	-14.02* (7.52)	-7.81** (3.45)
Remote \times 1(Post) \times Startup	13.07** (5.63)	7.78 (7.45)	30.95*** (10.98)	22.97*** (8.74)	13.06** (5.47)
KP rk Wald F	111.33	70.48	72.09	26.29	185.42
N	207,857	123,122	109,314	71,906	49,211
Fixed Effects					
Time	✓	✓	✓	✓	✓
Firm \times Individual	✓	✓	✓	✓	✓

Notes:

Table 10: Per-Employee Geographic Reach

	# States / Employee (1)	# MSAs / Employee (2)	# Locations / Employee (3)
Panel A: OLS			
Remote \times 1(Post)	-0.007** (0.003)	-0.010*** (0.004)	0.005 (0.004)
Remote \times 1(Post) \times Startup	0.056*** (0.016)	0.054*** (0.019)	0.054*** (0.018)
Pre-Covid Mean	0.139	0.197	0.477
N	41,959	41,959	41,959
Panel B: IV			
Remote \times 1(Post)	-0.018** (0.007)	-0.011 (0.008)	0.023*** (0.009)
Remote \times 1(Post) \times Startup	-0.059 (0.080)	-0.045 (0.083)	0.015 (0.074)
Pre-Covid Mean	0.139	0.197	0.477
KP rk Wald F	16.40	16.40	16.40
N	41,959	41,959	41,959

Notes:

Table 11: Remote Work and Imputed Wages: Fixed-Effect Variants

	Log salary			
	(1)	(2)	(3)	(4)
Panel A: OLS				
Remote \times 1(Post)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Remote \times 1(Post) \times Startup	-0.00 (0.01)	-0.02** (0.01)	-0.00 (0.01)	-0.00 (0.01)
Pre-Covid Mean	11.49	11.49	11.49	11.49
N	229,862	224,708	222,531	222,402
Panel B: IV				
Remote \times 1(Post)	-0.01 (0.02)	0.03 (0.02)	0.08*** (0.01)	0.06*** (0.01)
Remote \times 1(Post) \times Startup	-0.04 (0.03)	-0.05* (0.03)	-0.08*** (0.02)	-0.07*** (0.02)
KP rk Wald F	140.60	123.43	127.26	121.69
N	229,862	224,708	222,531	222,402
Fixed Effects				
Time	✓	✓	✓	✓
Firm	✓			
Individual	✓			
Firm \times Individual		✓	✓	✓
Title			✓	✓
Location				✓

Notes:

Appendix

Tables

Table A1: First-Stage Diagnostics

	Remote \times 1(Post)		Remote \times 1(Post) \times Startup	
Panel A: Individual-level				
Teleworkable \times 1(Post)	0.23*** (0.01)	0.24*** (0.02)	-0.00* (0.00)	-0.00*** (0.00)
Teleworkable \times 1(Post) \times Startup	0.16*** (0.02)	0.16*** (0.03)	0.39*** (0.02)	0.40*** (0.02)
1(Post) \times 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 1(Post)	0.83*** (0.03)	—	-0.00 (0.00)	—
Teleworkable \times 1(Post) \times Startup	-0.41*** (0.08)	—	0.41*** (0.07)	—
1(Post) \times 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 1(Post)	-0.51 (0.46)	-1.44*** (0.50)	-1.48*** (0.52)	-17.33*** (3.91)
Remote \times 1(Post) \times 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 1(Post)	-3.36 (2.91)	-6.60 (4.08)	-6.75 (4.19)	-105.59*** (28.11)
Remote \times 1(Post) \times 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

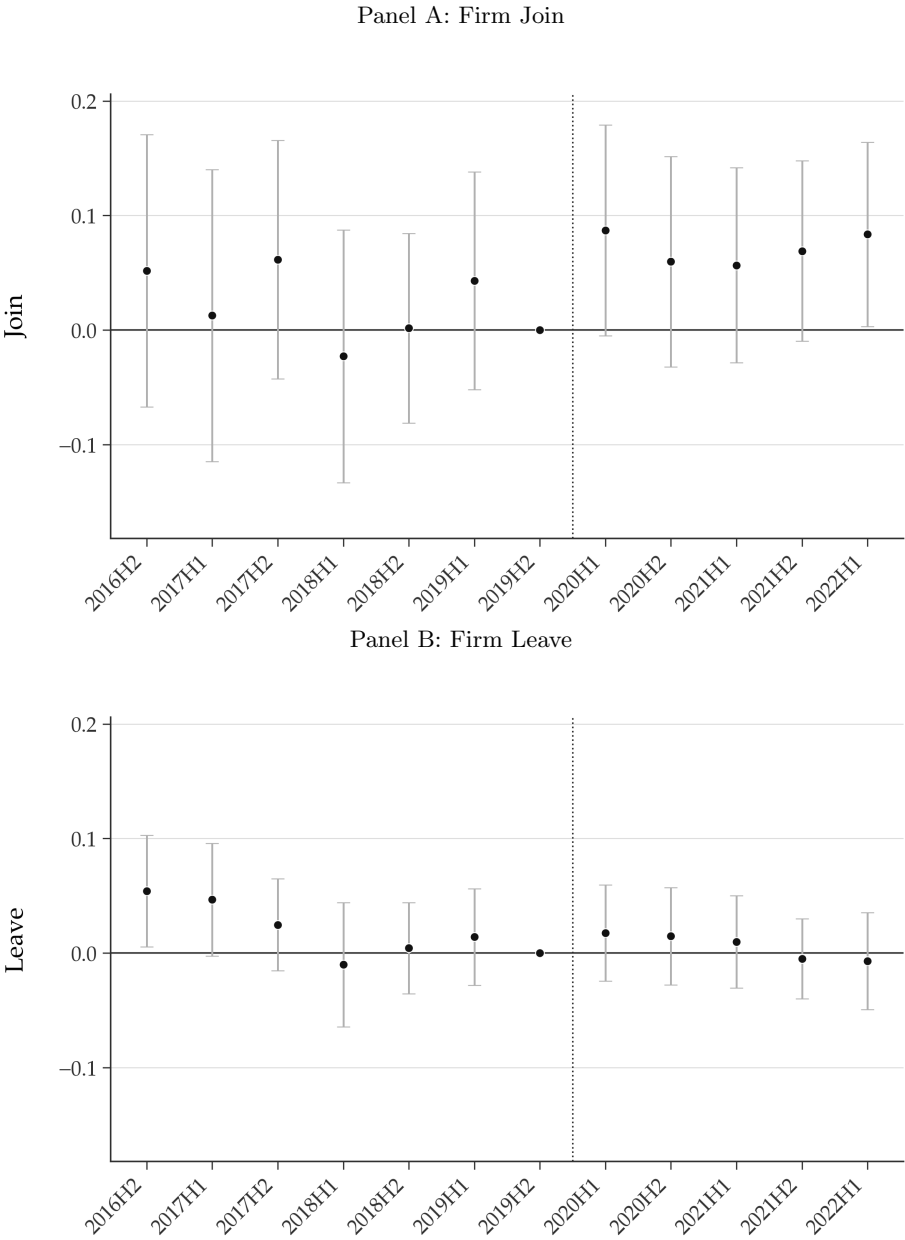
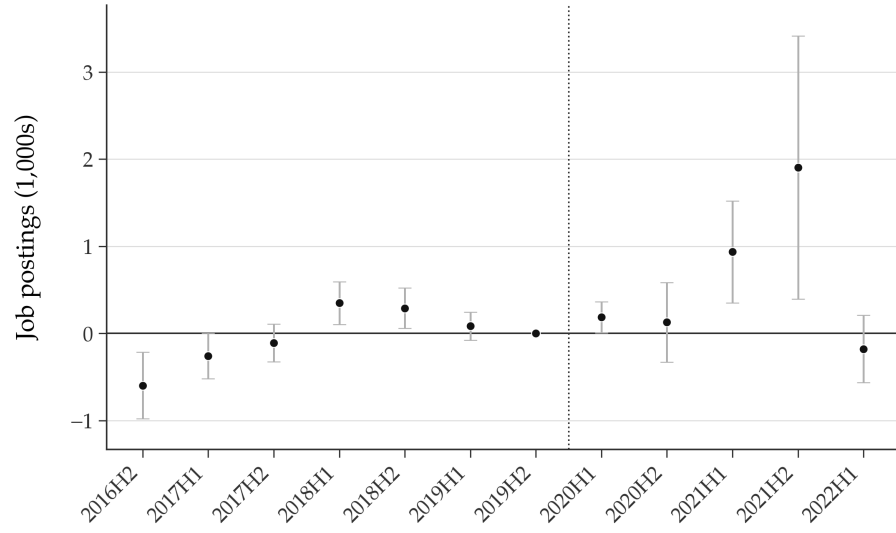


Figure A2: Event Study of Job Postings and Fill Rates

Panel A: Job Postings



Panel B: Hires per Posting

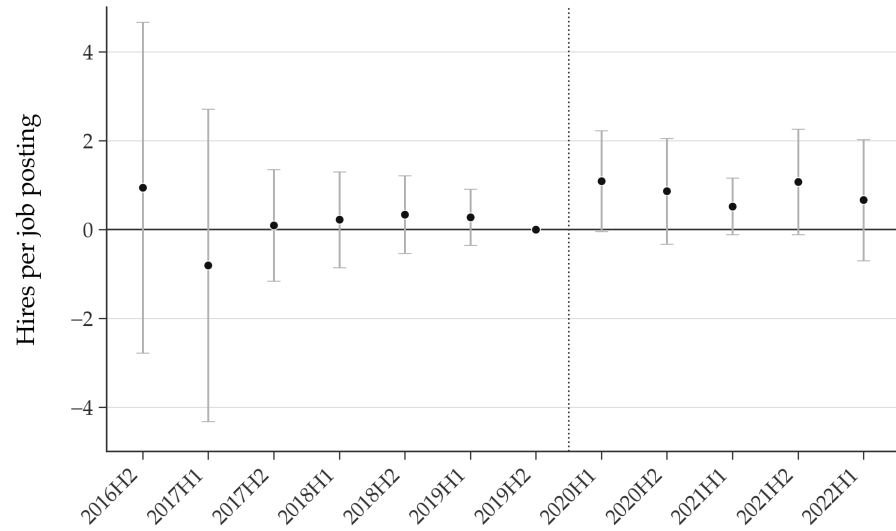
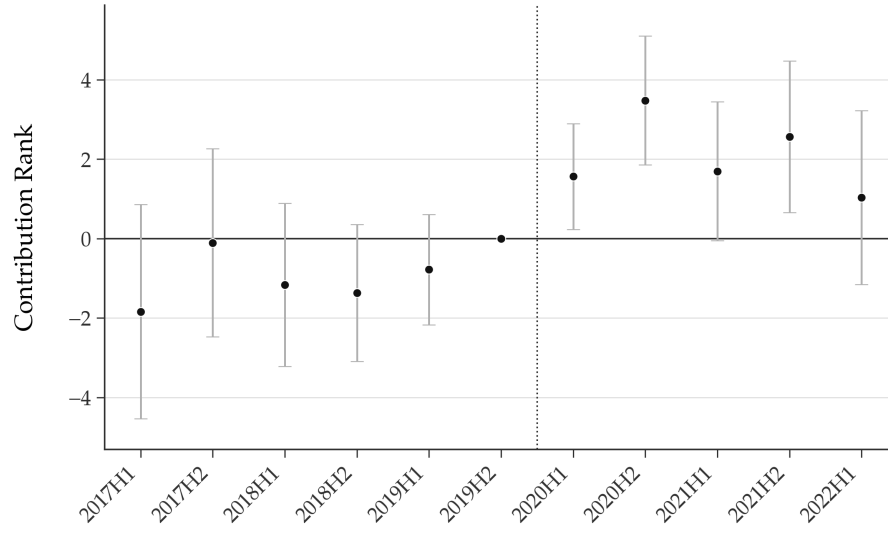


Figure A3: Event Study of Fully Remote Key Outcomes

Panel A: User Productivity



Panel B: Firm Growth

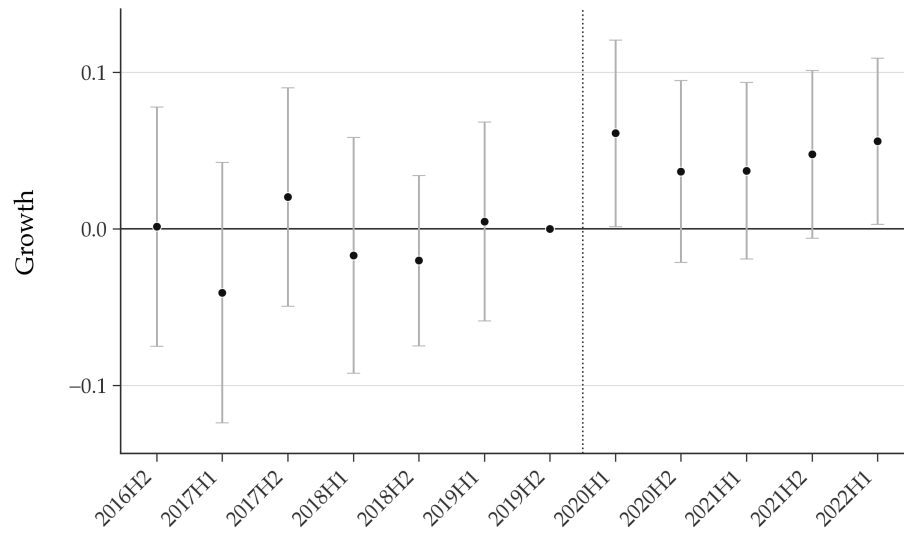
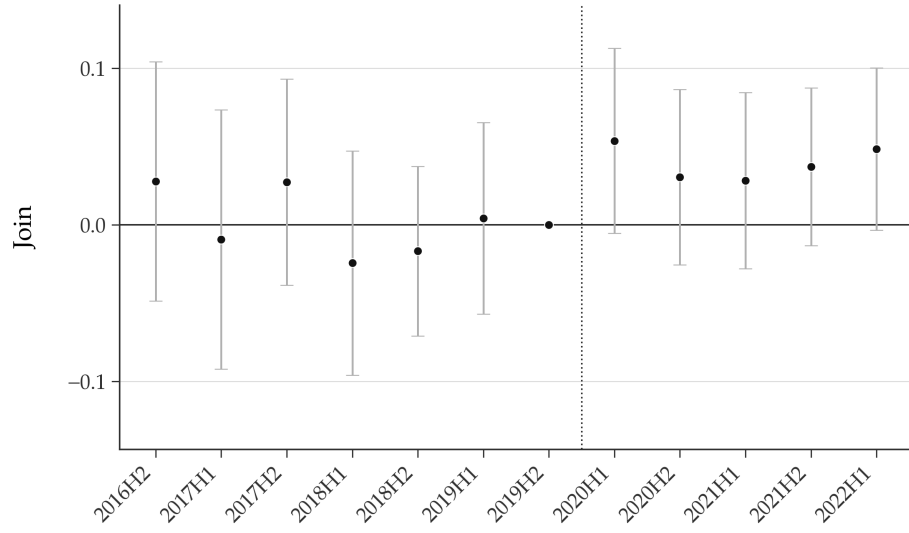


Figure A4: Event Study of Fully Remote Labor Flows

Panel A: Firm Join



Panel B: Firm Leave

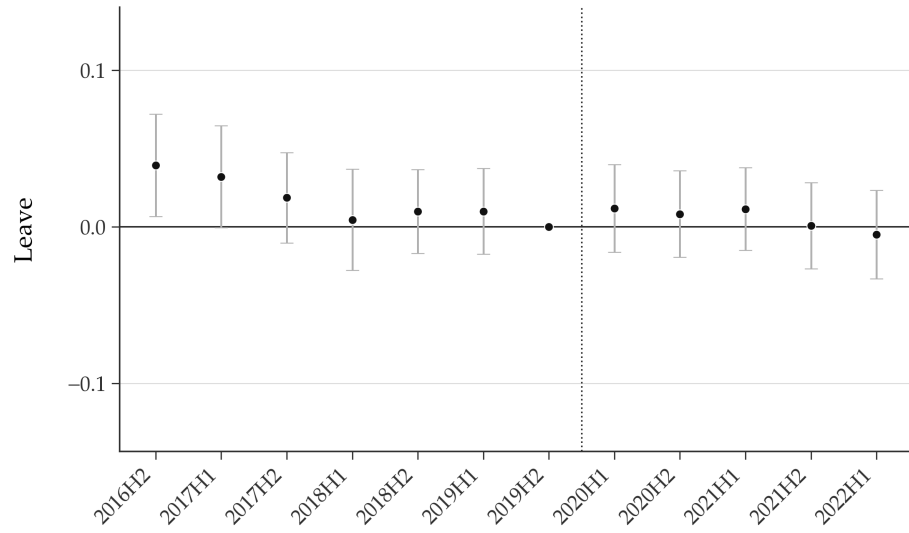
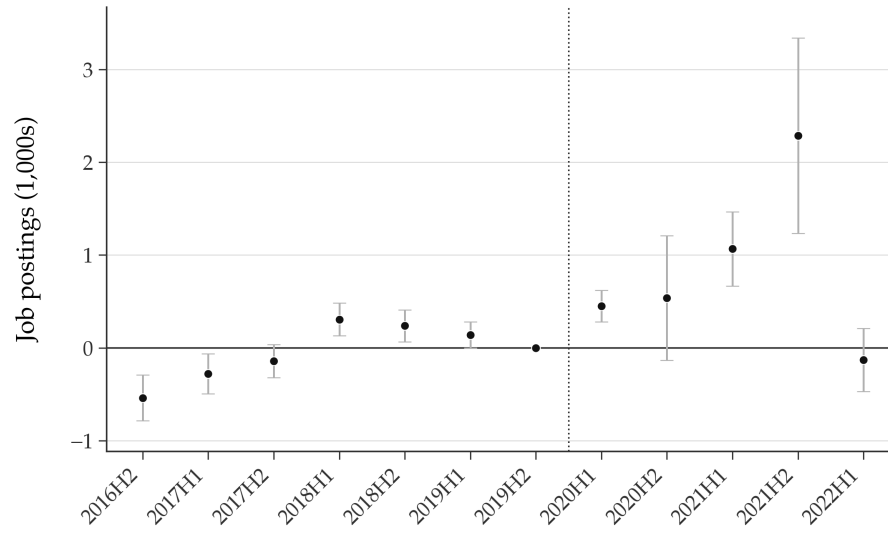


Figure A5: Event Study of Fully Remote Hiring Channels

Panel A: Job Postings



Panel B: Hires per Posting

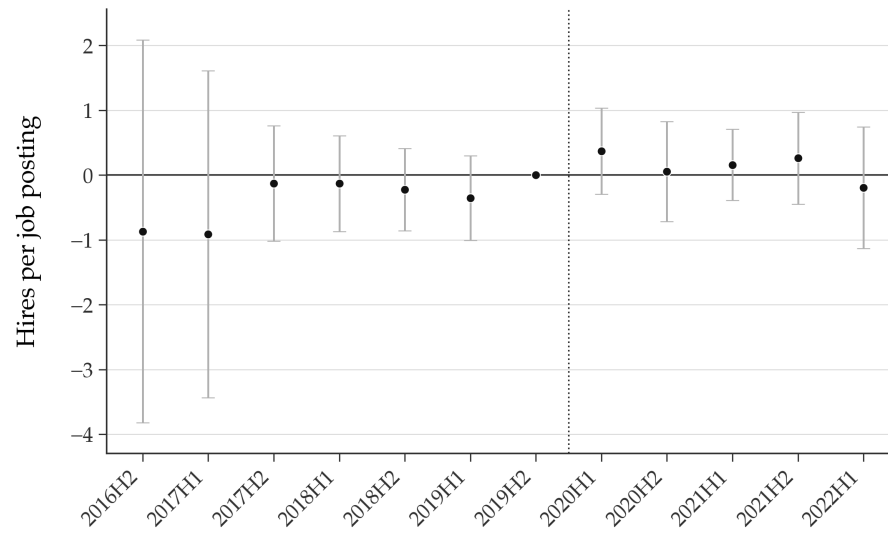
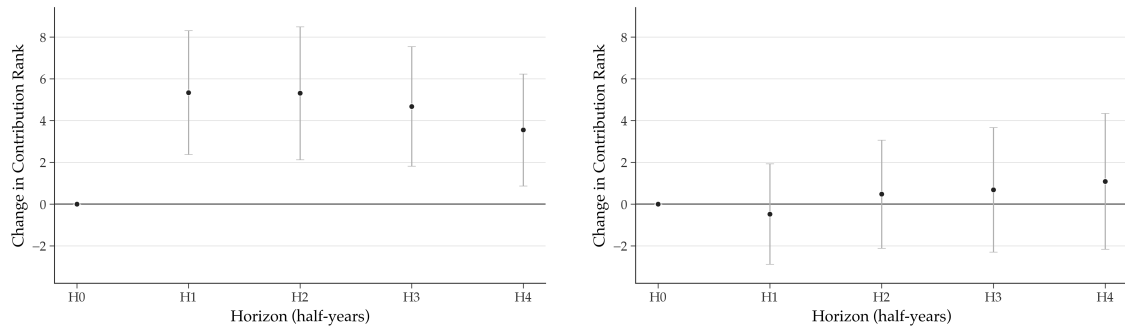


Figure A6: Impulse Responses

Panel A: Hybrid/In-person



Panel B: Fully Remote

