Managing Remote Team Coordination: Experimental Evidence on Constrained and Flex Scheduling

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Remote Work and Teams

Effective coordination critical for successful team work in unpredictable task environments

- Dessein and Santos (2006); Hinds and Mortensen (2005); Lyons (2017)

Team work is increasingly being performed remotely

- Pre-dated COVID-19 (Dhawan and Chamorro-Premuzic, 2018)

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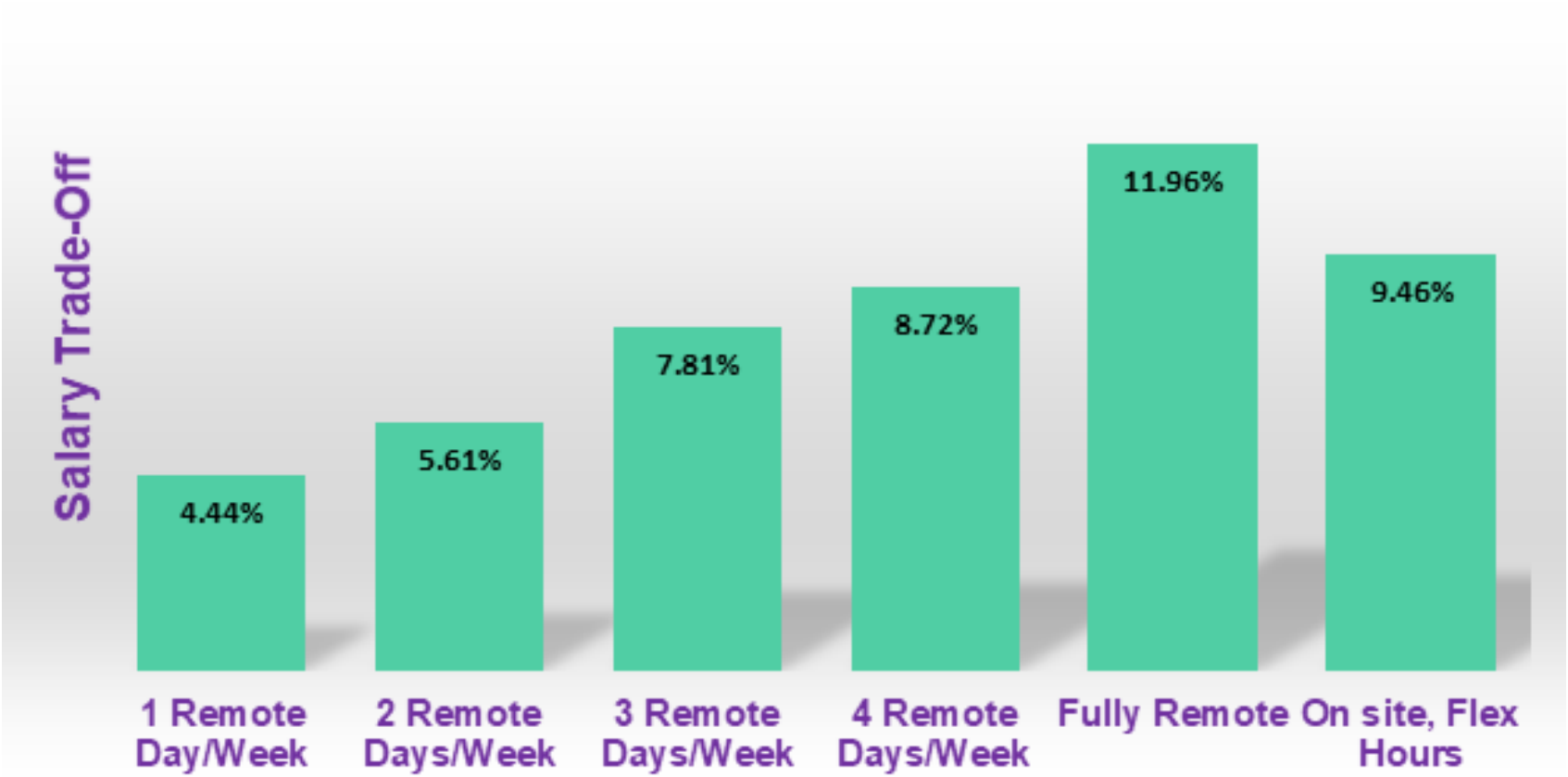
Theoretically and empirically, there are benefits and costs to remote work for organizations

- Benefits include flexible work hours and corresponding worker satisfaction gains (Bloom et al., 2022), larger pool of workers (Agrawal et al., 2015)
- Costs include communication barriers (Maznevski and Chudoba, 2000; Yang et al., 2022)

Remote Work and Schedule Flexibility

Anecdotal evidence suggests flex hours may be largest benefit of remote work



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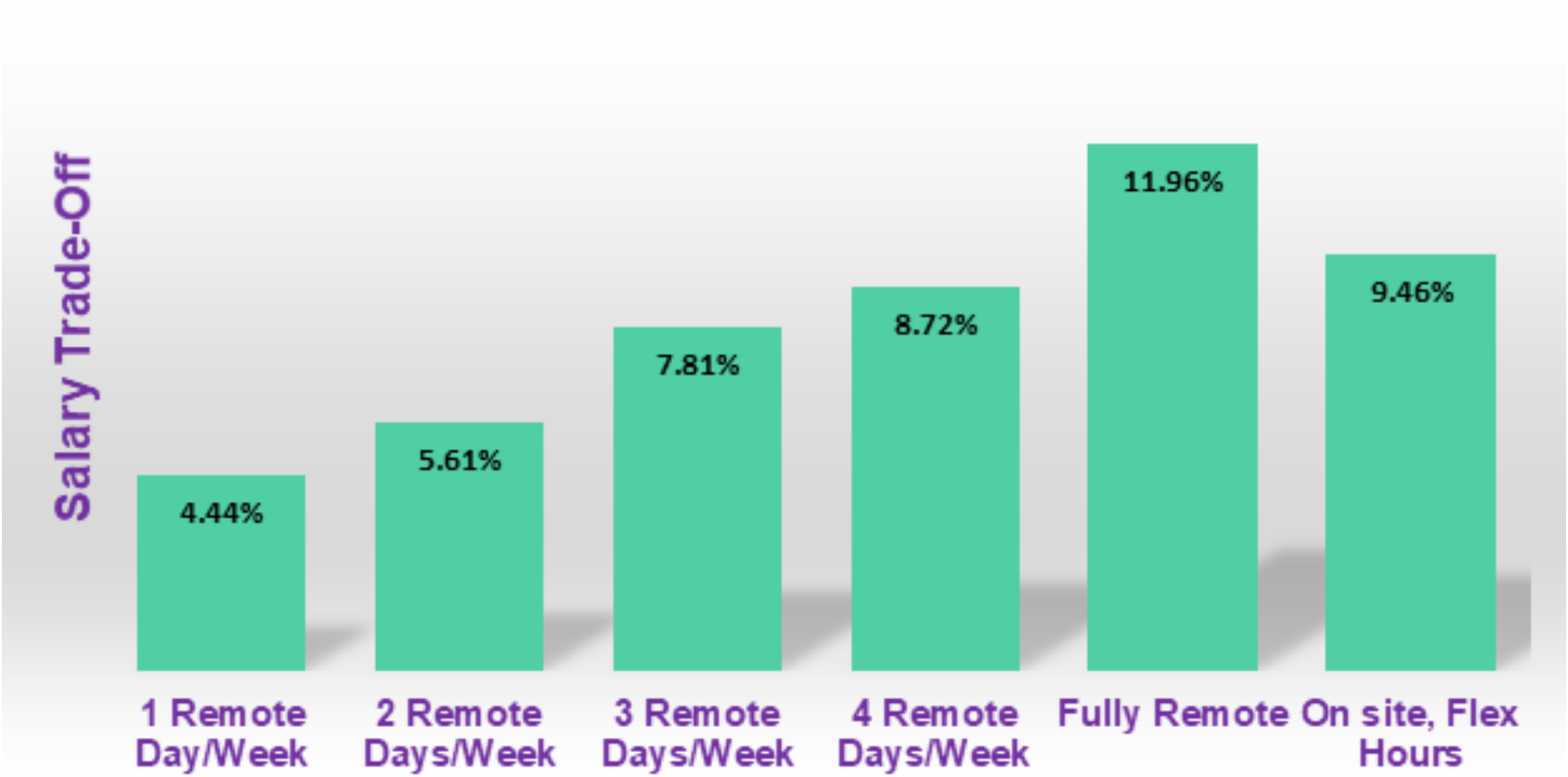

Allowing for occassional flex hours can improve worker performance (e.g. Angelici and Profeta, 2020)

Team Coordination and Schedule Flexibility

Possible performance risk of flex schedules in remote work to team coordination

- Higher uncertainty about speed of information exchange when coordinating with non-physically co-located teammates on unknown schedule
  - People may be slow to reply to email/chat/phone if monitoring is relatively low, flexible hours are expected

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- Higher uncertainty about speed of information exchange when coordinating with non-physically co-located teammates on unknown schedule
  - People may be slow to reply to email/chat/phone if monitoring is relatively low, flexible hours are expected
- These barriers may deter communication, reduce overall coordination and its effectiveness
  - Yang et al. (2022) show remote work associated with less synchronous communication, narrower collaboration networks

Our Study's Objectives

We isolate scheduling flexibility in remote work to study whether constraining the flexibility of remote teams affects firm performance

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- Do jobs with less flexible hours attract different applicant pools?
- Does the extent of coordination differ in more or less flexible team work arrangements?
- Do teams perform differently with more of less work hour flexibility?
- How does this differ by the extent of ex-ante communication frictions within a team?

Experimental Design: Work Setting

Field experiment on UpWork (Burbano, 2021; Lyons, 2017)

- Employers post jobs, workers apply
- Fixed price or hourly wage
- Publicly observable worker characteristics
- All work is completed remotely

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Translation task: Four-page academic blog post for translation from English to Swahili, Bengali

- Google translate and similar are not strong in these languages
- Add non-straightforward language
- Two languages allows analysis of whether context changes findings
  - Tanzania and Kenya have higher ethnic diversity than Bangaldesh; similar on power distance, individualism
- Fixed price job with $20 budget per team member

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- Post two jobs at a time
  - One Swahili, one Bengali
  - One constrained, one flexible

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  - One constrained, one flexible
- Applicants apply by bidding on job, submitting cover letter
- Applicants who bid at most $20 and display some awareness of translation language hired
- Hire 60 workers/30 teams per post, switch language-schedule pair
- Only independent freelancers permitted to apply (no agencies)

Experimental Design: Work Process

- Teams of two to complete task, half of post page assigned to each team member
- $5 bonus offered for cohesive complete submissions that combine both halves
- Teammates asked to join work Slack room, given own channel for team communication
  - Could not prevent unobservable teammate DMing, contact through UpWork
- Each page should take hour to complete, job posting advertised 2 hour job
- Deadline 24 hours after hiring

Experimental Design: Work Process

Task-Specific Coordination Considerations

- Fully cohesive document requires moderate interdependence, individual job completion does not require any
- Ex-ante uncertainty over necessary extent and timing of useful communication for cohesive document (Dessein and Santos, 2006)
- Uncertainty over teammate abilities
  - Optimal flow of information between teammates likely varies by team membership
- Small team size reduces cost of coordination (Van de Ven et al., 1976)

Experimental Variation

Randomize which translation language is assigned constrained or flex schedule during first hiring period

- One schedule type per language at a time reduces worker confusion, awareness of study

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- Constrained job applicants asked for 2-hour windows of availability, teammates are assigned to work during an overlapping availability window
- Flexible job workers not told when they should work

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Pre-registered second round of hiring same teams, stratified randomization into flexible or constrained for second translation task (Not yet done)

Data: Outcome Variables

1. **Communication**:
   - Both joined Slack channel (0/1)
   - Communicated in slack room (0/1)
   - Content of communication (NOT YET)
   - For robustness: Survey report of communication

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2. **Job performance**:
   - Cohesive document submitted (0/1)
   - Translation Quality
     - Evaluated on 1-9 sclae by 4 professional translators per language (Arnold et al., 1995; Weng et al., 2019)
     - Primary quality measure = Average of 4 scores
     - Quality evaluated separately from cohesiveness
   - High performance
     - Combines cohesiveness and individual quality
     - Equal to one if above median quality and cohesive, 0 otherwise

Independent Variables & Descriptives

Primary Independent Variables:

1. Flexible or Constrained
2. Swahili or Bengali
3. Gender composition (same or different genders in team)
   - Following evidence that mixed gender teams have harder time communicating (Berge et al., 2016; Kelemen et al., 2020)

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Team Characteristics:

1. Average education
2. Average experience on platform
3. Big city or not
4. Average hourly wage

Summary Statistics

	Mean	(Std. Dev.)	N
Outcomes			
Teammates Joined Slack	0.342	0.475	260
Any Slack Channel Communication	0.309	0.463	259
Cohesive Output	0.34	0.475	259
Incomplete Output	0.154	0.361	260
Translation Quality	6.058	1.212	230
High Performance (0/1)	0.235	0.425	260
Work & Team Characteristics			
Flexible Schedule	0.538	(0.499)	260
Bengali Translation	0.465	(0.500)	260
No Gender Diversity	0.619	(0.487)	260
Both Female	0.100	(0.301)	260
Both Male	0.519	(0.501)	260
At Least 1 from Big City	0.712	0.454	260
Average Team Education	0.952	(0.457)	260
Total Platform Experience	6.256	(15.266)	250
Average Advertised Wage	13.584	(8.138)	256

Summary Statistics by Schedule

	Constrained	**Flexible**	p-val of Diff
Outcomes			
Teammates Joined Slack	0.350	0.336	0.810
Any Slack Channel Communication	0.336	0.286	0.383
Cohesive Output	0.361	0.321	0.501
Incomplete Output	0.15	0.157	0.874
Translation Quality	6.092	6.022	0.658
High Performance	0.258	0.214	0.405
Work & Team Characteristics			
Bengali Translation	0.508	0.429	0.200
No Gender Diversity	0.642	0.600	0.492
Both Female	0.108	0.093	0.679
Both Male	0.533	0.507	0.675
At Least 1 from Big City	0.692	0.728	0.515
Average Team Education	1.008	0.904	0.065*
Total Platform Experience	7.195	5.482	0.378
Average Advertised Wage	12.769	14.271	0.142

Estimation Approach

Investigate effect of flex scheduling on team coordination and performance

- Combined impact of flex scheduling on selection, individual motivation, and team effectiveness to test for net effect
- Condition on hiring round to control for changes in pool and motivation over time
- Condition on team observables; managers can observe these when making hiring decisions

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Test for heterogeneous effects of flex scheduling

- By language
- By gender diversity

Regression Estimate: Main Effects without Controls

	(1) Joined Slack	(2) Slack Communication	(3) Cohesive	(4) Incomplete	(5) Quality	(6) High Peformance
Flexible	-0.064	-0.093	-0.073	0.030	-0.131	-0.093*
	(0.060)	(0.058)	(0.061)	(0.046)	(0.157)	(0.054)
Bengali	-0.011	0.034	-0.140**	0.027	-0.573***	-0.106*
	(0.060)	(0.058)	(0.061)	(0.046)	(0.158)	(0.054)
Observations	246	246	246	246	217	246
R^2	0.066	0.059	0.032	0.010	0.075	0.050

Standard errors in parentheses. Regressions include hiring round fixed effects * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Regression Estimate: Main Effects with Controls

	(1) Joined Slack	(2) Slack Communication	(3) Cohesive	(4) Incomplete	(5) Quality	(6) High Peformance
Flexible	-0.065	-0.103*	-0.074	0.013	-0.152	-0.090
	(0.061)	(0.059)	(0.062)	(0.046)	(0.158)	(0.055)
Bengali	-0.039	0.007	-0.136**	0.033	-0.490***	-0.102*
	(0.064)	(0.062)	(0.065)	(0.049)	(0.169)	(0.058)
No Gender Diversity	0.017	0.012	0.016	-0.065	-0.118	0.005
	(0.062)	(0.060)	(0.063)	(0.047)	(0.162)	(0.056)
At Least 1 Big City	-0.114*	-0.091	0.021	-0.002	0.425**	0.007
	(0.068)	(0.066)	(0.069)	(0.052)	(0.180)	(0.062)
Average Education	-0.077	-0.149**	-0.020	-0.071	0.068	0.025
	(0.068)	(0.066)	(0.069)	(0.051)	(0.184)	(0.062)
Platform Experience	0.001	0.001	0.000	0.000	0.004	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.006)	(0.002)
Average Wage	-0.000	-0.001	-0.000	0.004	0.003	0.001
	(0.004)	(0.004)	(0.004)	(0.003)	(0.012)	(0.003)
Observations	246	246	246	246	217	246
R^2	0.084	0.088	0.033	0.032	0.104	0.053

Standard errors in parentheses. Regressions include hiring round fixed effects * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Regression Estimate: Robustness to Survey Measure of Communication

	(1) Both Report	(2) Communicating
Flexible Schedule	0.019	0.045
	(0.085)	(0.081)
Bengali Translation	0.007	0.022
	(0.088)	(0.083)
Observed Slack Channel Communication		0.347***
		(0.086)
Observations	148	148
R^2	0.042	0.144

Standard errors in parentheses. Regressions include hiring round fixed effects and controls for gender diversity, worker city, team education, team experience, and team wages. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Regression Estimate: Coordination & Team Success

	(1) Cohesive	(2) Incomplete	(3) Quality	(4) High Performance
Teammates Joined Slack	0.434***	-0.127***	0.137	0.314***
	(0.060)	(0.049)	(0.176)	(0.056)
Flexible Schedule	-0.046	0.005	-0.140	-0.070
	(0.056)	(0.046)	(0.159)	(0.052)
Observations	246	246	217	246
R^2	0.208	0.059	0.106	0.166

Standard errors in parentheses. Regressions include hiring round fixed effects and controls for gender diversity, worker city, team education, team experience, and team wages. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Regression Estimate: Heterogenous Effects, Language

	(1) Joined Slack	(2) Slack Comm	(3) Cohesive	(4) Incomplete	(5) Quality	(6) High Peformance
Flexible	-0.078	-0.159**	-0.048	0.045	-0.412*	-0.103
	(0.082)	(0.079)	(0.084)	(0.062)	(0.216)	(0.075)
Bengali	-0.054	-0.060	-0.105	0.071	-0.759***	-0.116
	(0.091)	(0.088)	(0.093)	(0.070)	(0.228)	(0.083)
FlexibleX Bengali	0.029	0.127	-0.059	-0.073	0.565*	0.027
	(0.123)	(0.120)	(0.126)	(0.094)	(0.322)	(0.112)
Flexible+Flex XBengali=0	0.705	0.820	0.259	0.715	0.661	0.81
Observations	246	246	246	246	217	246
R^2	0.084	0.092	0.034	0.034	0.117	0.053

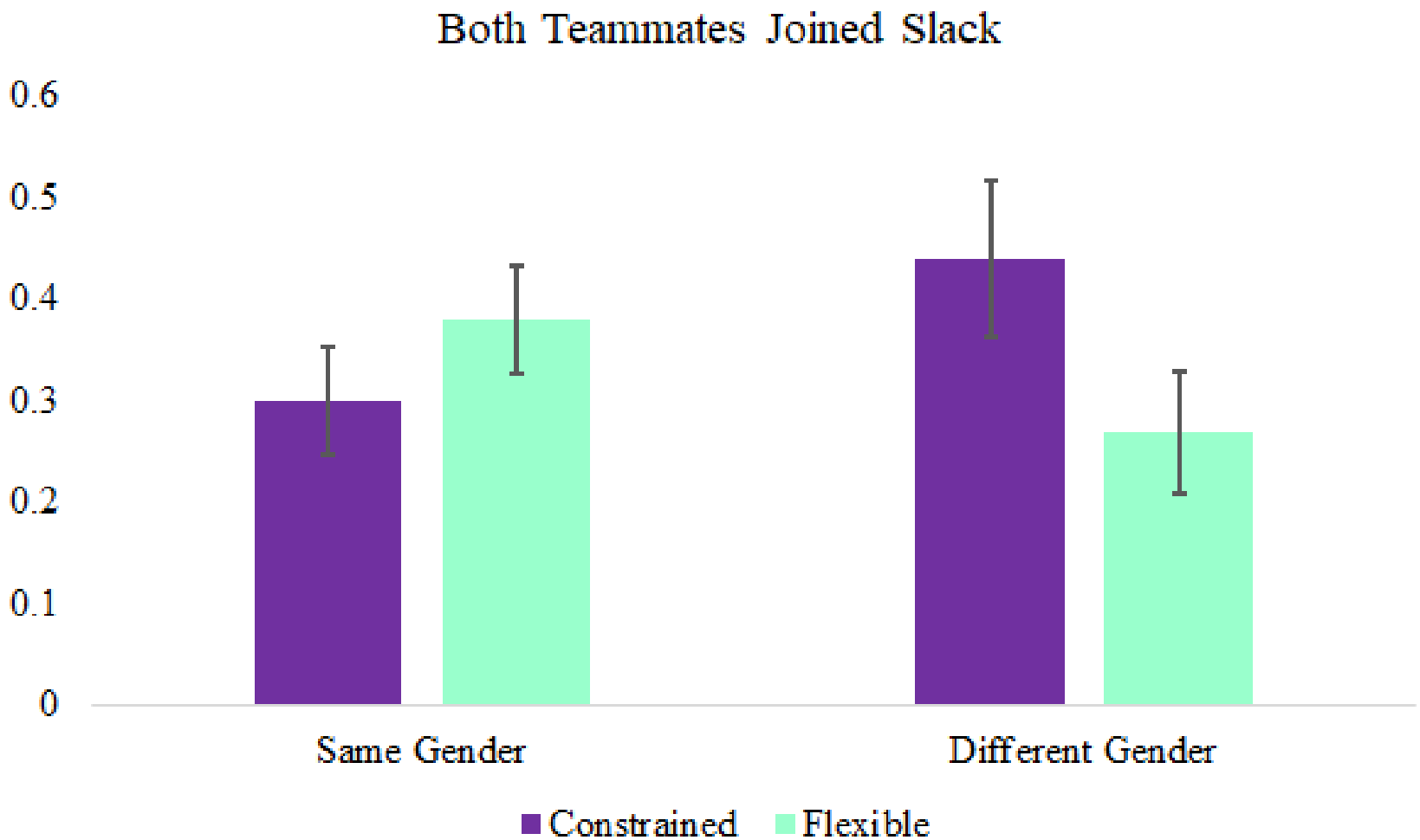
Standard errors in parentheses. Regressions include hiring round fixed effects and controls for gender diversity, worker city, team education, team experience, and team wages, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Regression Estimate: Heterogenous Effects, Gender

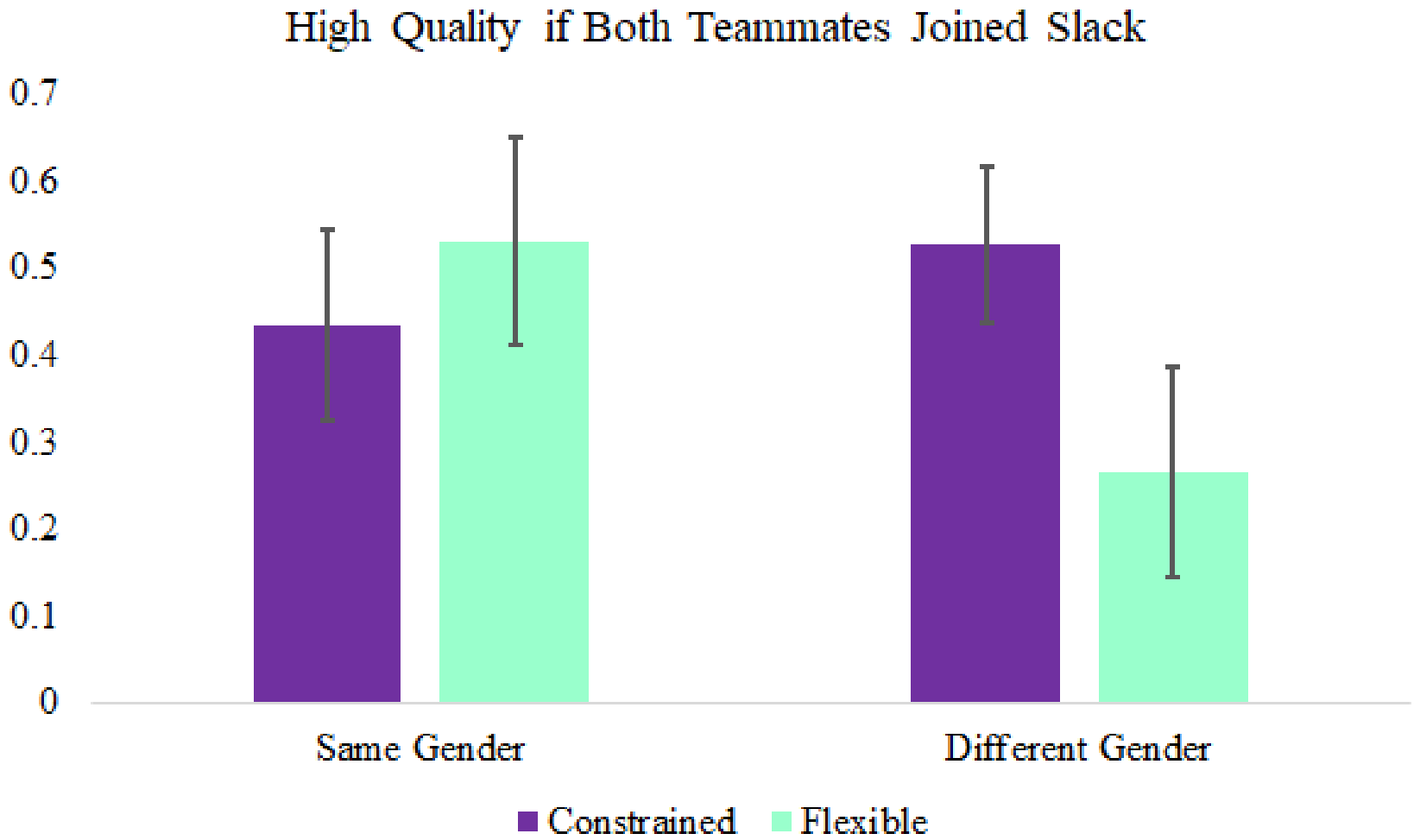
	(1) Joined Slack	(2) Slack Comm	(3) Cohesive	(4) Incomplete	(5) Quality	(6) High Peformance
Flexible	-0.181*	-0.202**	-0.207**	0.007	-0.455*	-0.203**
	(0.098)	(0.095)	(0.100)	(0.075)	(0.257)	(0.089)
No Gender Diversity	-0.089	-0.079	-0.106	-0.070	-0.367	-0.099
	(0.094)	(0.091)	(0.095)	(0.072)	(0.233)	(0.085)
FlexibleXNo Gender Diversity	0.189	0.164	0.218*	0.010	0.495	0.185
	(0.126)	(0.122)	(0.128)	(0.096)	(0.334)	(0.114)
Flex+FlexXNo Diversity=0	0.787	0.712	0.900	0.790	0.969	0.799
Observations	246	246	246	246	217	246
R^2	0.093	0.095	0.045	0.032	0.113	0.063

Standard errors in parentheses. Regressions include hiring round fixed effects and controls for gender diversity, worker city, team education, team experience, and team wages, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Attempted Coordination by Schedule and Gender Mix



Conditional Performance by Schedule and Gender Mix



Restricted to teams where both teammates joined Slack.

Regression Estimate: Self-Reported Relative Work

	(1)	(2)	(3)
	Both Report Same Workload		
Flexible Schedule	0.136	0.107	0.149
	(0.086)	(0.113)	(0.139)
Bengali Translation	-0.210**	-0.243**	-0.213**
	(0.088)	(0.120)	(0.091)
No Gender Diversity	-0.014	-0.007	-0.005
	(0.084)	(0.086)	(0.121)
FlexibleXBengali		0.069	
		(0.174)	
FlexibleXNo Gender Diversity			-0.020
			(0.175)
Observations	136	136	136
R^2	0.095	0.096	0.095

Standard errors in parentheses. Regressions include hiring round fixed effects and controls for gender diversity, worker city, team education, team experience, and team wages, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Study Summary

We isolate effect of flex scheduling on remote team coordination and performance

- Flex scheduling is important benefit of remote work for workers, impact on team performance theoretically ambiguous

Experiment design allows incorporation of real-world mechanisms through which flex scheduling can impact teams

- Differential selection, worker satisfaction, coordination

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We find constrained schedules outperform flex schedules on average, but negative effect of flex schedules driven by mixed gender teams and Swahili teams

- Suggests ethnic and gender diversity can exacerbate coordination uncertainty associated with flex schedules
- Next steps: Directly test if ethnic diversity is driver of negative flex schedule effects among Swahili translators

Implications

Our findings imply that more careful management of remote team scheduling is important when team communication is likely to be more challenging and when coordination is important for team success

- They also imply that self-directed scheduling can work well when communication barriers are low

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Communication challenges in diverse teams may dissipate over time

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Thank you!

Additional Slides

Flexible Job Posting

We have four pages of English text that we would like translated to Swahili. The text is a blog post written to communicate research findings to the general public. Machine translation is unable to accurately perform the translation.

We are looking to hire two people to complete this together, and each person hired will be assigned to translate 2 of the 4 pages of text. We would like this completed within 24 hours of hiring.

Please apply if interested!

Constrained Job Posting

We have four pages of English text that we would like translated to Swahili. The text is a blog post written to communicate research findings to the general public. Machine translation is unable to accurately perform the translation.

We are looking to hire two people to complete this together, so we will be asking which two-hour windows you are available during a 24-hour work window from the start of the contract. Each person hired will be assigned to translate 2 of the 4 pages of text.

Please apply if interested!

Back