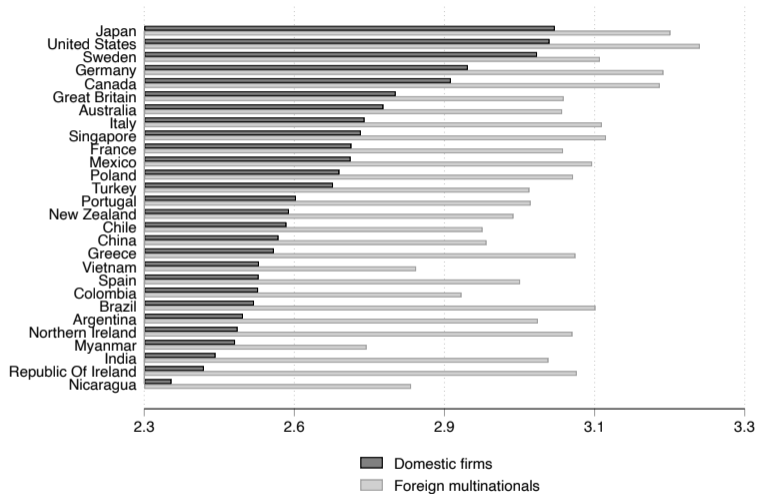# Language Barriers in MNCs and Knowledge Transfers

Louise Guillouët   Amit Khandelwal   Rocco Macchiavello
Madhav Malhotra   Matthieu Teachout
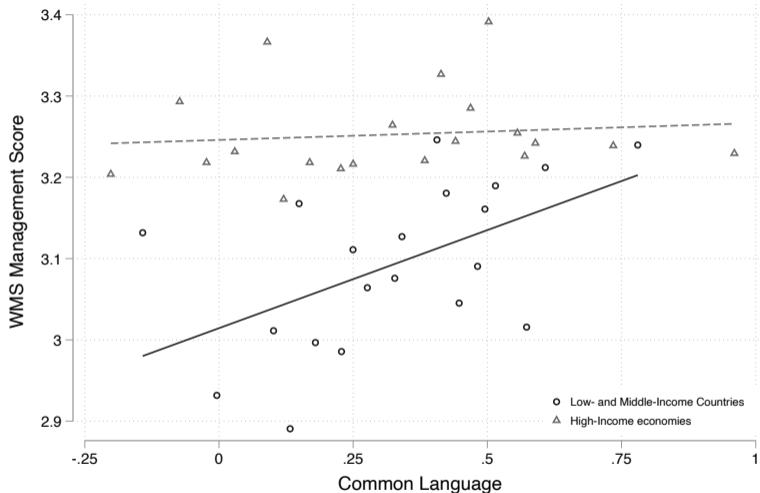
OECD, Yale & NBER, LSE, Columbia GSB, Pôle emploi

December 2023

MNC Management Practices

Chart comparing management practice scores for Domestic firms and Foreign multinationals across countries (Japan, United States, Sweden, Germany, Canada, Great Britain, Australia, Italy, Singapore, France, Mexico, Poland, Turkey, Portugal, New Zealand, Chile, China, Greece, Vietnam, Spain, Colombia, Brazil, Argentina, Northern Ireland, Myanmar, India, Republic Of Ireland, Nicaragua). Horizontal axis ranges from 2.3 to 3.3.

Legend:
- Domestic firms
- Foreign multinationals

Source: Bloom, Genakos, Sadun & Van Reenen 09

WMS Management Practices and Common Language

- Sample: MNCs (f) in destination d from origin o from the World Management Survey
- Run: $score_f = \alpha_o + \alpha_d + \beta \ln dist_{od} + \gamma lang_{od} + \pi \ln size_f + \epsilon_f$

Foxconn struggles with Language Barriers

Inside Foxconn's struggle to make iPhones in India

Chinese engineers are flying to India to train the next generation of iPhone builders.

Using language apps, half-remembered classroom English, and gestures, Li and hundreds of his Chinese colleagues were tasked with translating the Foxconn formula for an Indian workforce largely unfamiliar with the intensity and intricacies of 21st-century electronics manufacturing.

Language barriers became most apparent when dealing with equipment, which is often sourced from China. "All machines have Mandarin. Standard operating procedures, work instructions, commands — everything comes only in [Chinese]. Even the software is like that," an Indian senior manager said. "Even the 'emergency button' will be written in Mandarin."

Chinese engineers told *Rest of World* they train Indian colleagues on operating and repairing machines with the help of translation apps, or with more primitive methods. "Body language is universal," one Chinese engineer said.

Introduction

Management practices are important drivers of firm performance Bloom & Van Reenan 07, Bloom et al 2013

- tacit & non-routine skill, transfers occur through communication & interactions Polani 66, Gibbons & Henderson 12
- knowledge transfers from interactions of managers from richer to less-rich countries Giorcelli 19, Giorgelli & Li 21
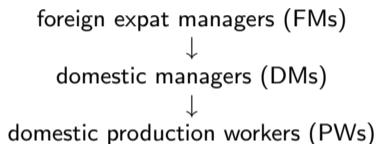
MNCs are a natuaral place to study the importance of communication for mgt knowledge transfers

- source of high productivity & management practices Helpman et al 04, Bloom Van Reenan 07, Antràs Yeaple 12 BvR 07
- global workforce with employees of different nationalities and languages Antras et al 09, Garicano Rossi-Hansberg 15
- motivating figure from World Management Survey common language & mnc scores

Motivation

HQ of MNCs often bridge by sending foreign managers (FMs) to supervise domestic managers (DMs)

MNCs typically organized as a 3-tier hierarchy

<div align="center">

foreign expat managers (FMs)

↓

domestic managers (DMs)

↓

domestic production workers (PWs)

</div>

In our context – MNCs operating in Myanmar – FMs & DMs communicate in English

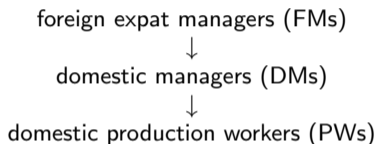– ..but lots of interactions "lost in translation" anecdotes

So, do Language Barriers between FMs & DMs impede knowledge transfers from MNCs to host countries?

– If so, is there a case for policy intervention?

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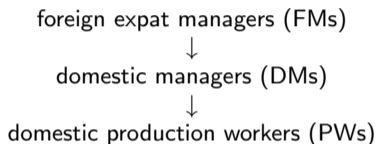 − ..but lots of interactions "lost in translation" anecdotes

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Research Design

1. Motivating facts
   - DMs want to learn mgt skills from MNCs
   - ... but have low English proficiency
   - ... and DMs with better English skills communicate more with FMs, more involved in mgt

2. Does reducing language barriers raise communication and knowledge transfers? Not so obvious.
   - would frequency of communication increase? (income & substitution effects)
   - are language barriers binding if companies use translation technologies?
   - FMs want to communicate firm-specific knowledge, DMs want general knowledge
   - would a language training program even be effective?
     - → RCT to exogenously shock language barrier + cv rating exercise

3. Is there scope for policy intervention? Not so obvious.
   - Planner might not be able to directly target a key source of inefficiency (non-contractible communication inside the MNC).
     - → A model to formalize the argument + additional evidence.

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Results

1. Randomly lower communication barriers to examine DM-FM communication
   - ► 154 DMs at 27 MNCs provided free 48h English training. treatment DMs:
   - ► ↑ English; ↑ FM interactions (rather than ↓) ; ↑ involvement; ↑ WTP to pay for more FM interactions
   - ► mgt "lab": ↑ communication w/ FM and ↑ supervising efficiency
   - ► Long-run surveys show treatment DMs reporting more soft skills*

2. Does DM-FM communication improve knowledge transfers?
   - ► 51 HR mgrs at domestic firms rate randomized characteristics of (hypothetical) job applicants
   - ► MNC experience, communication with FMs valued by domestic labor market

3. Why don't we see more language investment?
   - ► General skill (+ communication is costly): MNCs have diminished incentives to train
   - ► Non-contractible communication: DMs also have diminished incentives to privately invest
   - → scope for policy

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Literature Review

Language barriers
- FDI Blonigen 14; Buchardi et al 18; trade Rauch Trindade 02, Head Mayer 10, Melitz Toubal 14; assimilation Lazear 95
- organizations Neeley 17; returns to English Munshi Rosenzweig 06; survey Ginsburgh & Weber 20

MNCs and FDI spillovers
- Importance: Helpman et al 04, Bernard et al 09, Keller & Yeaple 13, Yeaple 13, Antras & Yeaple 14
- Spillovers: (Cohen and Levinthal 1990, Borensztein et al. 98, Aitken Harrison 99, Keller 04, Javorcik 04, Blalock & Gertler 09, Keller & Yeaple 09, Harrison Rodriguez-Clare 10, Balsvik 11, Javorcika & Spatareanub 11, Poole 13, Kee 15, Alfaro-Urena et al 19

Organization and Communication within firms
- Garicano 00, Dewatripoint & Tirole 05, Antras et al 06, Antras et al 08, Caliendo Rossi-Hansberg 12, Garicano Rossi-Hansberg 15, Caliendo et al 17
- Atkin et al 17, Blanes I Vidal 20, Sandvik et al 20, Espinosa & Stanton 22

Management in developing countries
- importance: Bloom Van Reenan 07; Bloom et al 16
- mgt transfers in larger orgs: Bloom et al 13, Macchiavello et al. 15 Advarhyu et al. 19, Giorcelli 19, Giorgelli & Li 21, Bianchi & Giorgelli 22

Road Map

Setting and Project Timeline

Myanmar's largest (and first) SEZ, Thilawa Zone

- 52% Japanese, 15% Thai, 11% Singaporean, 7% Korean, 20% Chinese/HK/EU
- 11% metal, 11% chemicals, 11% garment, 19% logistics, 15% distribution, 45% misc (electronics/food/construction/machinery) sectors/origins

Pilot surveys

- Summer 17 (firm), Fall 17 (employees)
- Summer 18 (firm, employees)

Project Surveys

- Jan 19, baseline
- Feb 19 - Mar 20, phone-based surveys
- Dec 19 - Jun 20, endline (phone after March 20)
- Summer 20, HR Managers at domestic firms (phone)
- Jan 21 - Sep 21, post-endline survey (phone)

Motivating Facts

Pilot surveys reveal motivating facts

1. Three-tier organizational structure

2. DMs want to learn mgt skills at MNCs

3. DMs have low English ability (& lower than FMs)

4. Language barriers are a challenge

5. DMs with better English report:
   - more communication with FMs
   - more involvement in firm's management

Road Map

Language Experiment Design

Sample

- 27 firms submitted a list of 298 DMs to enroll
- stratify by firm, half assigned to treatment: 154 T, 144 C `balance`

English courses with one of Yangon's leading English training provider `prices`

- native English teachers
- 48-hr course over 24 weekend sessions
- class size: 10-15 DMs
- DMs slotted into {beginner, pre-intermediate, intermediate} course based on provider's placement test

Main Specification

ITT
$$y_i = \alpha_f + \beta treat_i + \gamma y_{i0} + \sigma mode_i + \epsilon_i$$

- y_i post-treatment avg (post $\equiv$ after 75% course)
- y_{i0} pre-treatment avg
- α_f firm fixed effects (strata)
- $mode_i$ endline phone survey indicator
- s.e. clustered by department

TOT
$$y_i = \alpha_f + \beta takeup_i + \gamma y_{i0} + \sigma mode_i + \epsilon_i$$

- $takeup_i \in [0, 1]$, instrumented by $treat_i$
- s.e. clustered by department

Language Experiment Results

1. Take-up 46%, English improves `takeuptable`

2. DM-FM communication

3. DM involvement in the management of people improves

4. Management "lab":
   - DMs talk more with "FMs"
   - DM mgt efficiency improves

5. DMs' (hypothetical) WTP to communicate with FMs increases

6. Learning? `anecdotes` `job outcomes`

`spillovers?` `english outside firm` `endline attrition`

Road Map

Setting & Motivating Facts

Language Experiment

Resume Ratings

Model, Supporting Evidence

Resume Ratings

Evaluate demand for (hypothetical) job applicants

- – Recruit experienced Myanmar HR managers at domestic firms `sumstats`
- – Show pairs of applicant profiles with random characteristics, answers to interview questions

Block 1: Demand for English, MNC experience, ... `block 1`

Block 2: Demand for comm frequency and hard skill, conditional on English ability x MNC experience: `block 2`

Road Map

Setting & Motivating Facts

Language Experiment

Resume Ratings

Model, Supporting Evidence

Model and Supporting Evidence

Model clarifies why there may be underinvestment in language acquitions details

- Two complementary "investments" in general skills for DM: language, *communication with FM inside the firm*

1. If DMs learn general mgt skills through communication, MNCs under invest
   - resume rating confirms MNC experience and communication valued in labor market
   - Treatment DMs report learning more soft skills compared to DM
   - ...and apply to more jobs (but not differential exit or salary growth)

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   - DM's wtp for communication > FM's opportunity cost of time DM WTP and FM wage
   - DM's desired communication with FM > actual communication time DM-FM comm. DM wages and comm

3. Scope for policy intervention
   - calibration reveals most DMs and average MNC would not pay for this language training npv
   - DMs and FMs seem unable to contract on surplus generated by *this* training attendance

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Conclusion

External validity

- – Common three-tier MNC organizational structure
- – MNCs by definition involve interactions of *culturally* distant employees
  - ▶ Many MNCs do have language policies (communication frictions are taken seriously)

"Today's policy literature is filled with extravagant claims about positive spillovers from FDI but the evidence is sobering" Rodrik 99

- – Some govts subsidize language training (e.g., Costa Rica, African nations subsidizing Mandarin)
- – These results provide a rationale

Thank You

MNC Management Practices
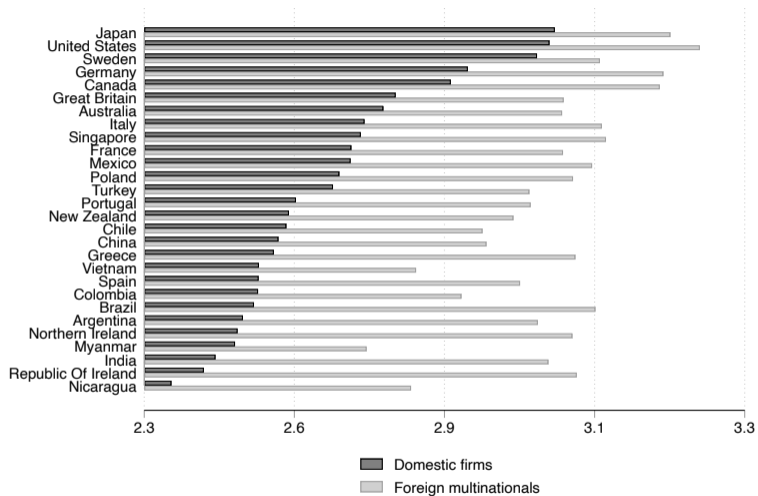
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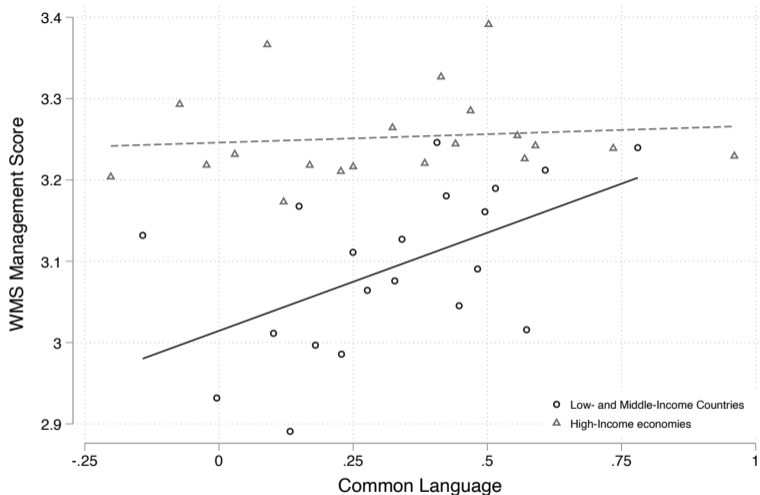
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Origins and Sectors
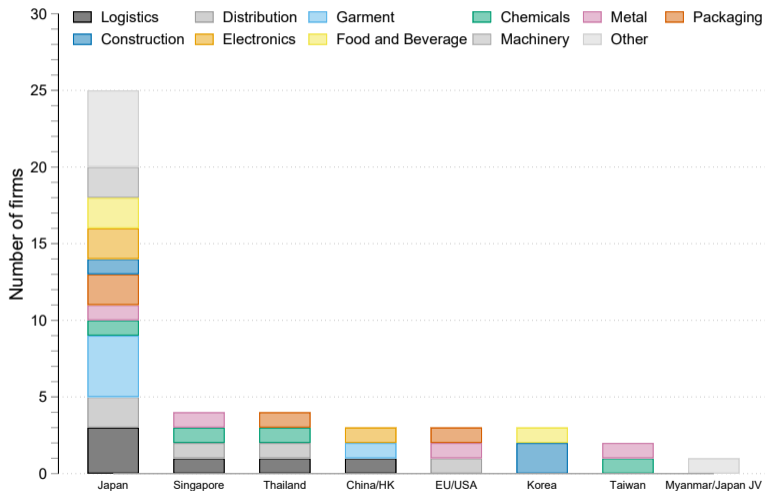
Fact 1: Three-Tier Organizational Structure

	Mean	Std Dev	N firms	N
Total Employees †	141.4	215.9	45	5144
Foreign managers (FMs)				
Number	4.5	4.9	30	134
Wage (USD) †	2002	2100	12	61
Age (yrs)	39.3	9.1	12	23
Tenure at company (yrs)	8.8	8.4	12	23
Tenure at company in Myanmar (yrs)	2.2	1.7	12	23
English score (%)	63.6	25.1	12	23
Share proficient in English (%) ‡	32.3	41.2	17	-
Domestic managers (DMs)				
Number	13.3	11.7	30	400
Wage (USD)	363	486	30	366
Age (yrs)	28.5	7.1	30	378
Tenure at company (yrs)	1.4	1.3	30	400
English score (%)	45.0	23.4	30	400
Share proficient in English (%) ‡	11.1	17.1	17	-
Production workers (PWs)				
Number †	119.2	220.3	27	3218
Wage (USD) †	99	32.3	24	2199

Notes: †: SEZ administrative data, ‡: pilot surveys. Table excludes specialized skilled workers, ≈ 10/firm.

- monthly salary bn $200 & $1000 (GDP/c $1300)

- tasks: monitoring employees, customer/supplier logistics, invoicing, sales reports, financial accounts

- DMs spend 33% of workday in meetings (compared to 27% in DeFilippis et al 20) back

Fact 2: Why Work at the SEZ?
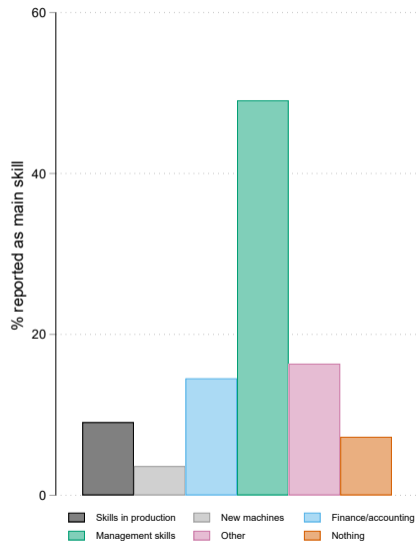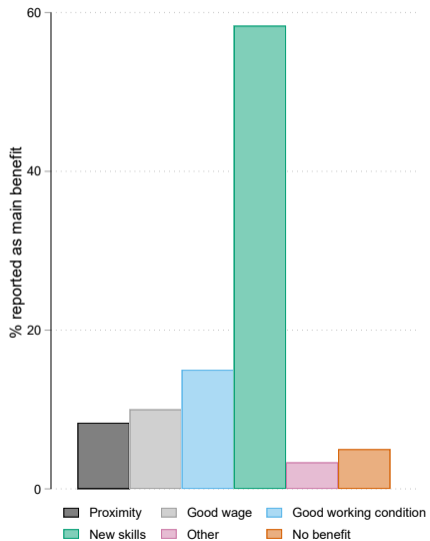
Fact 3: DMs Low English Proficiency?
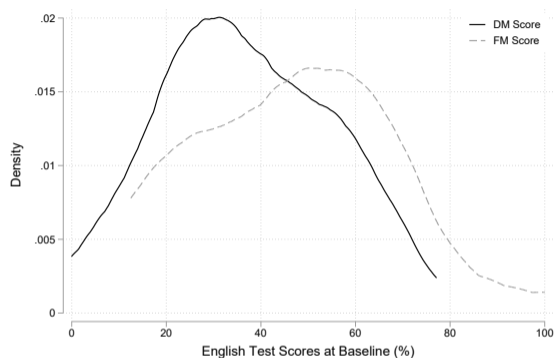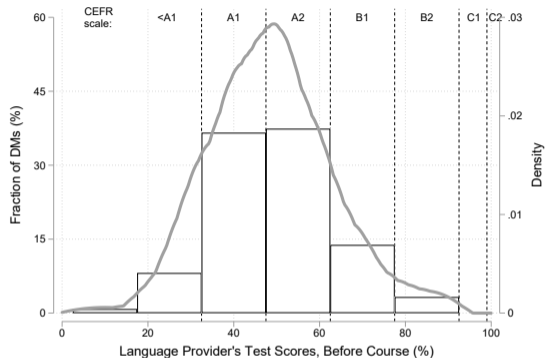
A0 Very little command of basic phrases, if any. **A1** Can understand and use only a few everyday expressions/phrases aimed at the satisfaction of needs of a concrete type.
A2 Can understand sentences and frequently used expressions for areas of immediate relevance but not much beyond.
B1 Can understand the main points of clear standard input on familiar matters regularly encountered in work, school, leisure, etc.
B2 Comfortable in most situations with a degree of spontaneity that makes regular interaction with native speakers quite possible without strain.
C1 Comfortable in nearly all situations, strong vocabulary, few errors. **C2** Fluency at near mother tongue level.

Other Language Test scores
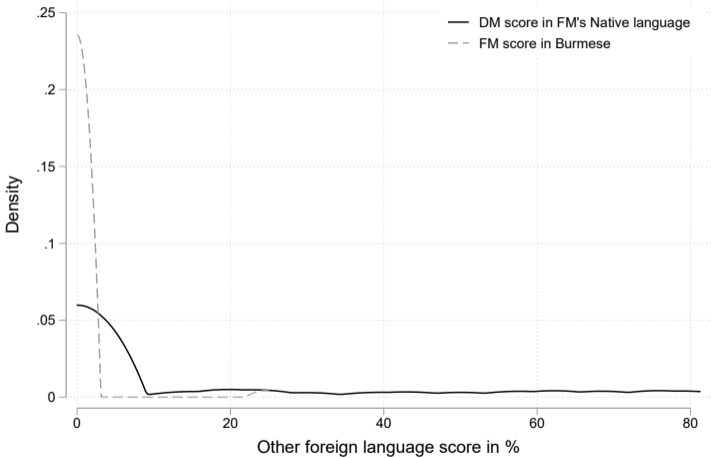
English Test Details

Listening test

- Participant listens to 16 audio files (clubbed as 4 sections of 4 files each in an order of increasing difficulty level) and answers MCQs
- Same format for endline and baseline, but content of questions changed keeping difficult level comparable
- Avg raw baseline score for control is 7.5 (sd: 3.5) /16
- Avg raw endline score for control is is 8.7 (sd: 3.9) /16
- Participant has to answer 2/4 questions correctly in the first section to progress further

Speaking test

- Participant has to speak for >30 seconds on
- Baseline: Describe your job at the firm.
- Endline: Where do you see yourself in the next 10 years?
- Graded on customized 6-pt CEFR scale (A1, A2, B1...)
- Graded by 2 independent consultants, and scaled to percentage score

Fact 3: DMs Low English Proficiency?
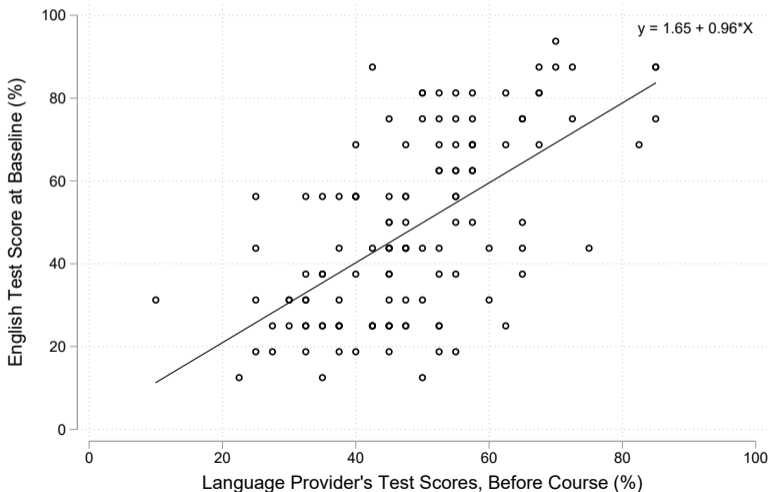
Fact 3: DMs Low English Proficiency?

Table 1: Mapping English levels across assessment types

	English level for Participants in the Language Program			
CEFR Grade	CEFR Level Description	Language Provider Test score (%)	Language Provider Level	Approximate IELTS Score
C2	Fluency at near mother tongue level. Extremely comfortable control over the language	100	Upper-advanced	8.0-9.0
C1	Comfortable in nearly all situations, strong vocabulary, few errors.	90-99	Advanced	6.5-7.5
B2	Comfortable in most situations. with a degree of spontaneity that makes regular interaction with native speakers quite possible without strain for either party.	76-90	Upper-intermediate	5.5-6
B1	Can understand the main points of clear standard input on familiar matters regularly encountered in work, school, leisure, etc.	61-75	Intermediate	4.5-5.0
A2	Can understand sentences and frequently used expressions for areas of immediate relevance (e.g. very basic personal and family information, shopping, local geography, employment) but not much beyond.	46-60	Pre-intermediate	3.5-4.0
A1	Can understand and use only a fewr everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type.	21-45	Elementary	2.5-3.0
A0	Not part of the official scale, but used widely as a benchmark for the very basic - lower than A1 - and corresponding to very little, if any, command of basic phrases and everyday expressions.	0-20	Beginner	1.0-2.0

Fact 4: Language Barriers at the Workplace

Lost time during meetings
- 33.8% of time lost in meetings due to language barriers

Comprehension during meetings by DMs
- If translating via Google, ˜62.9% (Google Translate: Japanese ↔ Myanmar)
- With translator, ˜84.0%

Translators are costly
- 50.0% of firms do not use translators
- part-time ˜$100/d; full-time $14/d (median DM wage $270.4/m)
- 76.9% firms use 2.3 employees (1.5hr/d) for translation

Only 2 firms provide formal language training programs

Fact 4: Language Barriers at the Workplace

- *FM, Japanese firm*: "I told the staff to handle products in certain way but they didn't really understand it and did it differently. Sometimes, they do things that I ask them not to do and until I find out about it, they are doing it wrongly."

- *FM, Korean firm*: "One problem is that it is difficult to teach Myanmar workers the details of their job due to language barriers."

- *DM, Thai firm*: "I could not understand very well what FM said, and could not give concise explanations to FMs. Also, I was afraid of speaking in meetings."

- *DM, Japanese firm*: "Although the boss can speak English, if the issue is important, we use translator. The [Myanmar] factory manager cannot speak English at all. So, when the translator is not there, we have to talk to him with body language or by drawing pictures. It takes more time."

- *DM, Japanese firm*: "He's [FM] not an English native speaker and we are not native speaker either. So, although we try our best, there are misunderstanding frequently. Sometimes, we don't know what he wants."

Fact 4: Language Barriers at the Workplace

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– *DM, Japanese firm*: "He's [FM] not an English native speaker and we are not native speaker either. So, although we try our best, there are misunderstanding frequently. Sometimes, we don't know what he wants."

Fact 4: Language Barriers at the Workplace

- *FM, Japanese firm*: "I told the staff to handle products in certain way but they didn't really understand it and did it differently. Sometimes, they do things that I ask them not to do and until I find out about it, they are doing it wrongly."

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Fact 5: Language Barriers and Learning

	Across managers				Within managers	
	BvR Mngt /15 (1)	Invt. (1-4) (2)	Freq. FM (1-4) (3)	Log wage (4)	Freq. (1-4) (5)	Time lost (%) (6)
English	0.227** (0.111)	0.130** (0.058)	0.108* (0.062)	0.161*** (0.031)		
FM					-0.751*** (0.056)	27.748*** (1.204)
FM × English					0.204*** (0.059)	-10.877*** (1.285)
Dem. controls	Yes	Yes	Yes	Yes	No	No
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
DM FEs	No	No	No	No	Yes	Yes
Mean of Dep. Var.	9.22	2.09	2.48	13.01	2.82	13.87
R2	0.29	0.49	0.38	0.75	0.62	0.73
N	375	375	350	345	774	776

Outcomes

- mgt knowledge score (1-15), involved in mgt (1-4), communication frequency with supervisor (1-4)
- how much of the conversation time with this boss do you lose (%)

back

Model Summary and Empirical Strategy

Non-contractible communication as a fact of "workplace life"

    ⇒ If DMs learn general mgt skills through communication ⇒ inefficiency

    ⇒ If communication is complementary w/ language ⇒ planner can intervene using language subsidies Model

Empirics:

    − Exp 1: HRs evaluate (hypothetical) applicants

        ⇒ check general mgt skills

    − Exp 2: English training

        ⇒ check language skills and communication are complementary

    − Further evidence: Non-contractibility

Takeup & English Proficiency

	First stage		Overall		Speaking		Listening	
	Takeup> 75% (1)	Takeup c. (2)	ITT (3)	TOT (4)	ITT (5)	TOT (6)	ITT (7)	TOT (8)
Treatment	0.456∗∗∗ (0.048)	0.568∗∗∗ (0.036)	0.153∗∗ (0.074)	0.257∗∗ (0.116)	0.212∗∗ (0.103)	0.346∗∗ (0.156)	0.142 (0.106)	0.237 (0.167)
Baseline value	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Strata FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	0.00	0.00	-0.08	-0.08	-0.07	-0.07	-0.10	-0.10
1st stage F-stat				278.37		314.56		275.86
R2	0.37	0.58	0.47	0.48	0.45	0.45	0.29	0.30
N	298	298	267	267	244	244	265	265

Balance Table

	Control	Treatment diff	N
Male (%)	0.38	0.00	298
	(0.04)	(0.05)	
Education (yrs)	6.87	0.04	298
	(0.04)	(0.06)	
Age (yrs)	28.2	0.6	281
	(0.7)	(0.6)	
Tenure (yrs)	1.30	0.03	298
	(0.12)	(0.11)	
Big 5 (z score)	-0.08	0.15	298
	(0.08)	(0.13)	
Monthly salary (USD)	352	20	273
	(32)	(42)	
English score (%)	47.4	0.4	298
	(2.0)	(2.9)	
Involvement score (1-4)	2.27	0.02	298
	(0.08)	(0.10)	
Management score (/15)	9.06	0.21	298
	(0.14)	(0.18)	
Time lost with FM (%)	25.32	3.15	284
	(2.42)	(3.08)	
Talk Freq. FM (1-4)	2.55	-0.18	286
	(0.08)	(0.10)*	
Endline attrition (%)	0.12	-0.06	298
	(0.02)	(0.03)*	

Language Provider Prices
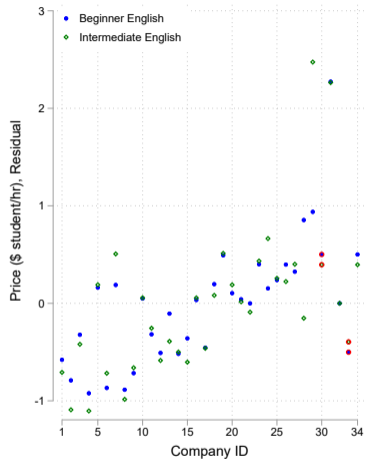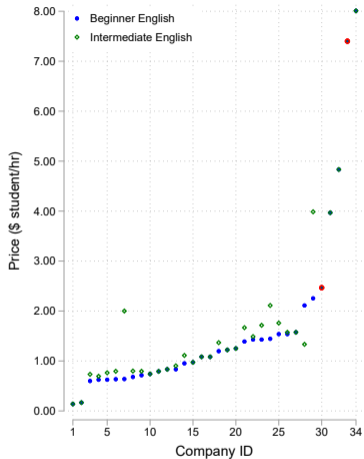
Red denotes companies that use english native-language teachers.
Right panel plots residual prices after controlling for location, certifications, native-english language teachers, advertising channel, and company size

Communication with FM

	Talk Fqcy (1-4)		Attend mtg (0/1)		Time lost (%)	
	ITT (1)	TOT (2)	ITT (3)	TOT (4)	ITT (5)	TOT (6)
Treatment	0.200∗∗ (0.098)	0.331∗∗ (0.150)	0.072 (0.055)	0.119 (0.084)	-1.969 (2.092)	-3.244 (3.186)
Baseline control	Yes	Yes	No	No	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	2.31	2.31	0.43	0.43	17.45	17.45
1st stage F-stat		328.53		287.64		281.57
R2	0.36	0.37	0.27	0.28	0.22	0.22
N	272	272	261	261	223	223

Talk Fqcy is the frequency of communication (1-Never, 2-Seldom, 3-Often, 4-Very Often). Attend mtg is a binary variable for if the supervisor was present at a meeting. Minutes lost (%) is the share of meeting lost in translation and repitition.

Spillovers

	English z-score (1)	Talk Freq FM 1-4 (2)	Time FM min. (3)	Time lost % (4)	People score 1-4 (5)	WTP FM (6)
Share Treatment	-0.006	0.002	-0.135	0.046	-0.003	0.920∗∗
	(0.005)	(0.004)	(0.157)	(0.102)	(0.004)	(0.407)
Baseline control	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	-0.08	2.58	24.66	17.45	2.27	32.23
R2	0.57	0.45	0.38	0.30	0.72	0.21
N	126	104	88	103	130	98

Involvement

	Involvement (1-4)				Score (/15)	
	People		Targets		Management	
	ITT (1)	TOT (2)	ITT (3)	TOT (4)	ITT (5)	TOT (6)
Treatment	0.127** (0.059)	0.215** (0.092)	-0.015 (0.090)	-0.026 (0.143)	0.070 (0.114)	0.117 (0.179)
Baseline control	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Team	Team	Team	Team	Team	Team
Control mean	2.27	2.27	2.67	2.67	6.32	6.32
1st stage F-stat		289.42		272.10		282.64
R2	0.68	0.69	0.39	0.39	0.94	0.94
N	272	272	272	272	272	272

Communication with DM

	Talk Fqcy (1-4)		Attend mtg (0/1)	
	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)
Treatment	-0.030	-0.049	0.039	0.064
	(0.107)	(0.165)	(0.056)	(0.087)
Baseline control	Yes	Yes	No	No
Firm FEs	Yes	Yes	Yes	Yes
Control mean	3.11	3.11	0.71	0.71
1st stage F-stat		306.88		287.64
R2	0.14	0.14	0.15	0.15
N	258	258	261	261

English Use Outside MNC

	Read textbooks		Watch news		Take courses		New job abroad		New job MNC		Watch movie		Travel		Study		Social media	
	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Treatment	0.056	0.097	0.036	0.061	-0.081	-0.138	0.011	0.020	0.083	0.143	-0.012	-0.020	0.025	0.044	0.022	0.038	-0.009	-0.015
	(0.082)	(0.129)	(0.062)	(0.097)	(0.088)	(0.140)	(0.024)	(0.038)	(0.067)	(0.107)	(0.078)	(0.124)	(0.044)	(0.068)	(0.050)	(0.079)	(0.087)	(0.137)
Baseline control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	0.41	0.41	0.16	0.16	0.28	0.28	0.03	0.03	0.11	0.11	0.59	0.59	0.07	0.07	0.07	0.07	0.41	0.41
R2	0.16	0.16	0.11	0.10	0.19	0.19	0.08	0.08	0.17	0.16	0.16	0.16	0.12	0.13	0.09	0.09	0.13	0.13
N	153	153	153	153	153	153	153	153	153	153	153	153	153	153	153	153	153	153

Management Simulation

$$\text{"FM" (staff)} \xrightarrow{\text{English}} \text{DM} \xrightarrow{\text{Burmese}} \text{2 "PWs" (enumerators)}$$

1. Separate 4 items that include {**stationary**, **plastic items**, **items with a cap**}
2. Remaining items should be placed {**below the table**, **on the side**}
3. Place the items one-by-one on the basis of each item's {**cost**, **weight**} in an order that is {**increasing**, **decreasing**}
4. Before closing the box, inspect that all items are placed {**vertically**, **horizontally**}
5. Keep the box on the {**table**, **ground**}

   all elements are randomized across managers and tasks, Burmese placebo

Outcomes:

- DM's time communicating with "FM" and "PWs"
- # of questions to "FM"
- # mistakes

Only surveyed ~half of firms due to covid19 lockdown back

Management Simulation Results

	Panel A: DM receives management task in English							
	"PWs" Time		"PWs" Mistakes		"FM" Time		"FM" Questions	
	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	-0.190∗	-0.365∗∗	0.100	0.193	0.351∗	0.675∗	1.032∗∗	1.982∗∗
	(0.097)	(0.181)	(0.258)	(0.458)	(0.185)	(0.352)	(0.425)	(0.812)
Baseline control	No	No	No	No	No	No	No	No
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	1.28	1.28	1.85	1.85	1.89	1.89	1.97	1.97
1st stage F-stat		53.81		53.81		53.81		53.81
R2	0.19	0.19	0.14	0.13	0.32	0.32	0.18	0.19
N	153	153	153	153	153	153	153	153

Management Placebo Results

	Panel B: DM receives management task in Burmese							
	"PWs" Time		"PWs" Mistakes		"FM" Time		"FM" Questions	
	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	-0.014	-0.028	0.054	0.103	-0.014	-0.027	0.262	0.504
	(0.044)	(0.078)	(0.075)	(0.136)	(0.065)	(0.114)	(0.187)	(0.351)
Baseline control	No	No	No	No	No	No	No	No
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	0.49	0.49	0.27	0.27	0.75	0.75	0.57	0.57
1st stage F-stat		66.40		66.40		66.40		66.40
R2	0.29	0.29	0.14	0.15	0.26	0.26	0.09	0.09
N	153	153	153	153	153	153	153	153

DMs WTP for FM Interactions

	FM		FM outside firm		DM	
	ITT (1)	TOT (2)	ITT (3)	TOT (4)	ITT (5)	TOT (6)
Treatment	32.7** (13.7)	53.6** (20.9)	19.1** (8.3)	32.3** (13.0)	7.7 (7.1)	12.6 (10.5)
Baseline value	No	No	No	No	No	No
Strata FEs	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	32.23	39.74	26.89	31.42	24.04	24.45
1st stage F-stat		225.32		273.98		243.48
R2	0.16	0.13	0.15	0.13	0.13	0.13
N	212	212	269	269	220	220

HR Managers Characteristics

	Mean	Sd	N
Age	29.3	6.1	50
Education (years)	16.2	0.9	48
Work experience (years)	7.0	4.9	51
Experience in FDI (years)	1.7	2.6	51
Resumes seen in the last 6 months	522.5	953.5	51
People recruited in the last 6 months	44.5	67.3	51
Recruited people with FDI exp.	10.7	25.8	51

Block 1: Hypothetical Job Applicants for General Manager

back BA business Yangon U of Economics, worked for 1 prior firm, married, live in Yangon

Show 20 pairs of profiles: screenshot

- – wage offer for each profile
- – how much did each profile learn at previous job (1-10)?
- – how involved was the applicant involved in mgt of people (1-4)?

Panel A: Donor Pool for Profile Characteristics	
Criteria	Values
Gender	{Male, Female}
Age	{25, 26}
Previous company size	{25 employees, 125 employees}
Work experience	{1 year, 3 years}
English level x Previous company ownership	{(Elementary, Myanmar), (Elementary, Japanese) (Advanced, Myanmar), (Advanced, Japanese)}

Block 1: Results

Premium for MNC experience, English proficiency, *and* interaction

	Wage offer (USD) (1)	Perceived Invt. (1-4) (2)	Perceived Learning (1-10) (3)
Advanced English	51.27∗ ∗ ∗ (7.48)	0.15∗ ∗ ∗ (0.05)	0.40∗ ∗ ∗ (0.11)
MNC Experience	33.08∗ ∗ ∗ (8.05)	0.03 (0.05)	0.28∗ ∗ ∗ (0.10)
Advanced English * MNC Experience	11.54∗ (6.77)	0.14∗∗ (0.06)	0.09 (0.13)
Age (=26)	2.93 (4.23)	0.01 (0.03)	-0.06 (0.06)
Gender (=Male)	9.07∗ (4.58)	0.02 (0.04)	0.15∗∗ (0.07)
Large size (=125)	39.96∗ ∗ ∗ (6.88)	-0.06 (0.07)	0.36∗ ∗ ∗ (0.12)
Total Experience (=3y)	70.75∗ ∗ ∗ (6.68)	0.47∗ ∗ ∗ (0.08)	1.17∗ ∗ ∗ (0.11)
Respondent FEs	Yes	Yes	Yes
Pair FEs	Yes	Yes	Yes
Mean	323.20	2.50	4.81
R2	0.83	0.73	0.77
N	2040	1560	2040

Block 2: Mechanisms

> back male, 3 yr exp. Japanese MNC, 125 employees, BA business Yangon U of Economics, married, Yangon, advanced English, foreign boss has advanced English

Show 11 pairs of profiles: screenshot

- Choose the preferred profile
- wage offer for each profile
- how much did each profile learn at previous job (1-10)?

Panel B: Donor Pool for Profile Interview Responses	
Criteria	Values
How frequently did you use Microsoft Office Package (Word, Powerpoint, Excel)?	{Frequently, Infrequently}
How often were you involved in setting and communicating the company's targets?	{Frequently, Infrequently}
How often did you interact with your foreign boss (formal/informal meetings, lunches etc.)?	{Frequently, Infrequently, I was hired to interact frequently with the foreign boss but interacted infrequently because he had to leave the country for a family emergency}

Block 2 Results

Frequent FM communication ≈ "hard" skill, selection is unlikely explanation

	Wage offer (USD) (1)	Perceived learning (1-10) (2)
Freq. communication with FM	40.81∗∗∗	0.52∗∗∗
	(5.36)	(0.08)
Selected to communicate freq.	2.79	0.10
	(5.59)	(0.08)
Freq. Microsoft user	33.90∗∗∗	0.43∗∗∗
	(4.24)	(0.06)
Freq. setting and communicating targets	53.12∗∗∗	0.84∗∗∗
	(5.92)	(0.10)
Respondent FEs	Yes	Yes
Pair FEs	Yes	Yes
Mean	410.24	5.51
R2	0.93	0.88
N	1122	1122

Resume rating: Block 1 Survey Screenshot

Please assess the two candidates

	Candidate A	Candidate B
Gender:	Male	Female
Age:	25	26
English level:	Advanced	Elementary
Previous company ownership:	Myanmar	Japanese
Previous company size:	125 employees	125 employees
Work experience:	3 years	3 years

Click on the better candidate (1/20)

Candidate A	Candidate B

Resume rating: Block 2 Survey Screenshot

Please assess the two candidates

Q1. How often did you interact with your foreign boss (formal/informal meetings, lunches)?

Candidate A: My interaction with the foreign boss was frequent.
Candidate B: My interaction with the foreign boss was infrequent.

Q2. How frequently did you use Microsoft Office Package (Word, Powerpoint, Excel)?

Candidate A: I used Microsoft Office Package frequently.
Candidate B: I used Microsoft Office Package infrequently.

Q3. How often were you involved in setting and communicating the company's targets?

Candidate A: I was frequently involved in setting and communicating company targets.
Candidate B: I was frequently involved in setting and communicating company targets.

Select the better candidate based on the responses (1/11)

| Candidate A | Candidate B |

Selection Option

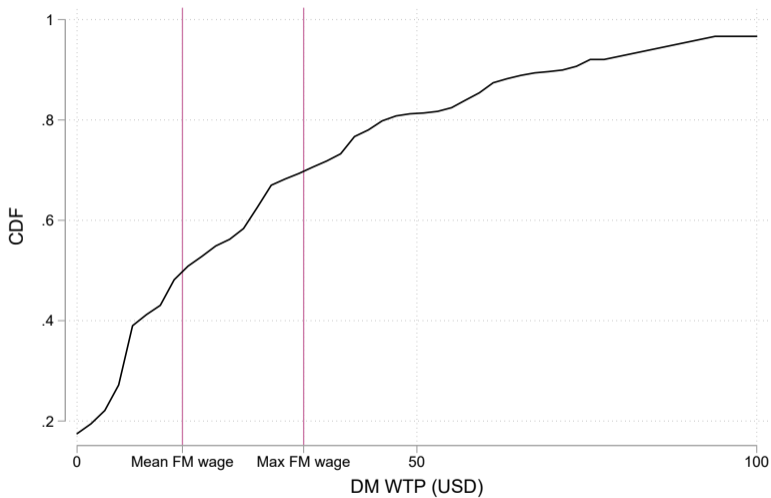| Interpretation of "..My FM had to leave suddenly due to a family emergency.."	
Response	Share (%)
Unexpected circumstances which shock communication	64.71
Excuse for infrequent communication	15.69
Did not make sense	7.84
Excuse and Unexpected circumstances	5.88
Excuse and Did not make sense	1.96
Other: Signal for good at remote communication	1.96
Excuse and Other	1.96

English Takeup Scores by Provider

DM WTP for FM's time and FM wage
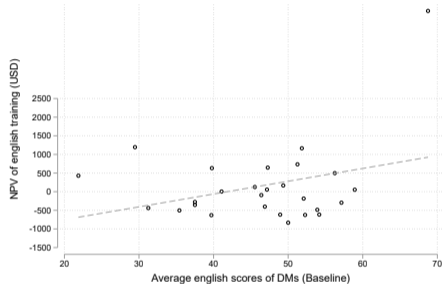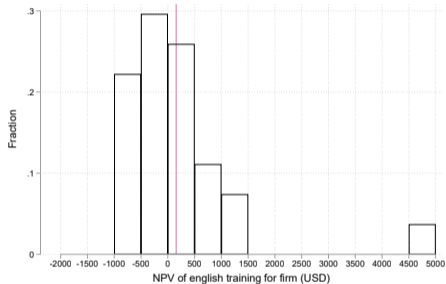
DM Desired v/s Actual communication with FM

CDF vs Hours spent talking with FM in past 7 days. Legend: Ideal amount, Actual amount.
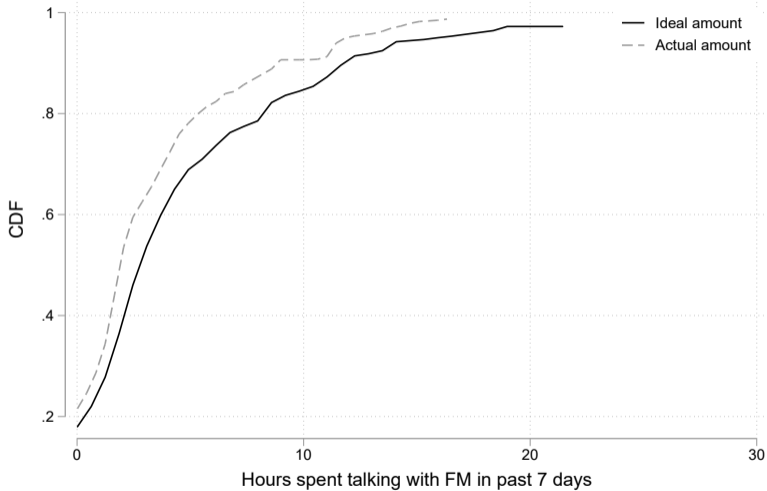
Communication and DM Wages

	Log wage		
	(1)	(2)	(3)
Talk Freq. FM (1-4)	0.263∗ ∗ ∗	0.149∗ ∗ ∗	0.120∗ ∗ ∗
	(0.032)	(0.030)	(0.028)
English			0.190∗ ∗ ∗
			(0.028)
Dem. controls	No	Yes	Yes
Firm FEs	Yes	Yes	Yes
Mean, Talk Freq. = 1	12.81	12.81	12.81
N	344	324	324
R2	0.46	0.67	0.72

Firm Returns to Providing Language Training

Back of Envelope: Is Private Investment Optimal?

- Use results to generate NPVs for firms and DMs to invest in language training
  - $r = 1.2\%$, monthly discount (source: WB)
  - $p = 3\%$, monthly DM attrition rate (~2yr DM tenure)

- Firm NPV

$$NPV_f = \frac{1}{r + p}\left(0.15 \times w_{PW,f} \times (DMSC_f)^{0.5} - 0.19 \times w_{FM,f} \times t_{FM,f} \right) - \$300$$

  - DM span of control: $DMSC_f^{0.5} = \left(\frac{PW_f}{DM_f} \right)^{0.5}$
  - mgt lab: 15% efficiency, 19% more time with FM
  - Avg NPV \$188 (sd 741) (<\$0 for 48% firms) firm npv

- DMs NPV

$$NPV_i = \frac{1}{r}\Delta w - OC_i - \$300$$

  - Δw: ~\$3
    - HR ratings: \$51 for advanced english (~2.3 sd)
    - language experiment raises proficiency by 0.15 sd
  - OC_i opportunity cost for 48 hr training
  - Avg NPV -\$194 (sd 47) (<\$0 for 100% DMs) DM npv

back

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back

Back of Envelope: Is Private Investment Optimal?

- Use results to generate NPVs for firms and DMs to invest in language training
  - $r = 1.2\%$, monthly discount (source: WB)
  - $p = 3\%$, monthly DM attrition rate (~2yr DM tenure)

- Firm NPV

$$NPV_f = \frac{1}{r + p} \left(0.15 \times w_{PW,f} \times (DMSC_f)^{0.5} - 0.19 \times w_{FM,f} \times t_{FM,f} \right) - \$300$$

  - DM span of control: $DMSC_f^{0.5} = \left(\frac{PW_f}{DM_f} \right)^{0.5}$
  - mgt lab: 15% efficiency, 19% more time with FM
  - Avg NPV \$188 (*sd* 741) (<\$0 for 48% firms) firm npv

- DMs NPV

$$NPV_i = \frac{1}{r} \Delta w - OC_i - \$300$$

  - Δw: ~\$3
    - ★ HR ratings: \$51 for advanced english (~2.3 sd)
    - ★ language experiment raises proficiency by 0.15 *sd*
  - OC_i opportunity cost for 48 hr training
  - Avg NPV -\$194 (*sd* 47) (<\$0 for 100% DMs) DM npv

back

Gross Returns from language training

- Firm gross returns = \$18

$$GR_f = 0.15 \times w_{PW,f} \times (DMSC_f)^{0.5} - 0.19 \times w_{FM,f} \times t_{FM,f}$$

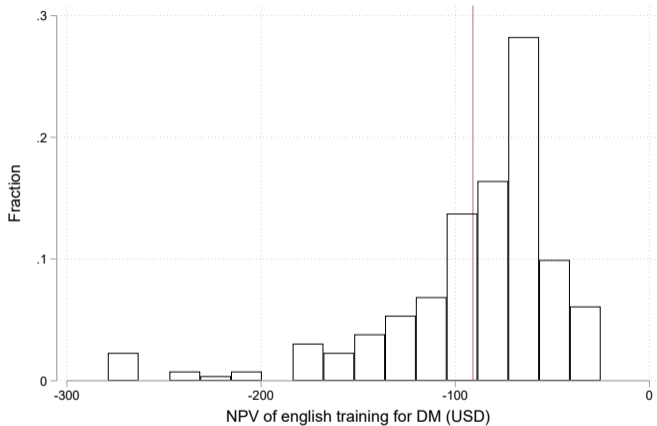 - DM span of control: $DMSC_f^{0.5} = \left(\frac{PW_f}{DM_f}\right)^{0.5}$
  - mgt lab: 15% efficiency, 19% more time with FM

- DM gross returns = \$3

$$GR_i = \Delta w$$

  - Δw: ~\$3
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back

DMs Returns to Purchasing Language Training

Average WTP for training reported by DMs: USD 100.

English class attendance

	DM Informed	DM Informed and Incentivized
FM Informed	Control	"FM" treatment
FM Informed and Incentivized	"DM" treatment	.

English class attendance

	Attend class	
	(1)	(2)
FM incentive	-0.027	-0.022
	(0.058)	(0.044)
DM incentive	0.057	0.063
	(0.050)	(0.051)
DM FEs	Yes	Yes
N DM	66	66
FM FEs	No	No
Week FEs	No	Yes
N weeks	28	28
Mean of Dep. Var.	0.57	0.57
N	471	471
R2	0.46	0.54
P-val test DM-FM	0.06	0.05

Anecdotes from Treatment DMs on Learning

- *DM, Japanese firm*: "I learned Marketing Strategy, Financial management, Report Evaluation and Analysis from FMs. I can learn these skills as my understanding level and communication skills are higher than before."

- *DM, Japanese firm*: "I have learned Excel formula from FM... English is a medium language while he was teaching formula, and I understood completely what he said because my listening skill is higher than before."

- *DM, Japanese firm*: "From FM, I have learned Microsoft Excel and PDCA (Plan Do Check Act cycle) which is used in Japan. There is a slight difference in learning process because I am not afraid of speaking with foreigners and I become to understand what they said."

- *DM, Japanese firm*: "I have learned punctuality, discipline, technical and management skills from Japanese Managers."

- *DM, Thai firm*: "Problem solving, Customer dealing skills have been learned from FMs. The learning process is faster as my confidence allows me to participate in meeting fully and I can understand very well what FMs present in the meetings".

Reported Skills

	Soft skills		Hard skills		Business skills	
	ITT (1)	TOT (2)	ITT (3)	TOT (4)	ITT (5)	TOT (6)
Treatment	0.073∗ (0.040)	0.123∗ (0.064)	0.009 (0.038)	0.015 (0.062)	-0.005 (0.025)	-0.008 (0.042)
Skill FEs	Yes	Yes	Yes	Yes	Yes	Yes
Strata FEs	Yes	Yes	Yes	Yes	Yes	Yes
Control Mean	0.49	0.46	0.31	0.29	0.32	0.31
1st stage F-stat		320		318		320
R2	0.18	0.19	0.16	0.17	0.17	0.17
N respondents	219	219	219	219	219	219
N	1314	1314	1095	1095	1314	1314

Soft skills: cognitive skills, customer relations, business etiquette, confidence, professionalism, written communication. Hard skills: Excel/Google Sheets, Powerpoint/Google Slides, Outlook/Gmail, Online tools (Dropbox, Zoom, Google drive etc.), task specific software (e.g. SAP, ERP Odoo). Business skills: financial management/budget control, general administrative skills, manpower planning, marketing strategy, supply chain management, international business knowledge (e.g. Kaizen)

Endline Attrition

	Responders			Non-responders			Difference	
	mean	sd	N	mean	sd	N	Diff	p
Share Male	0.38	0.49	272	0.46	0.51	26	0.083	0.26
Education (years)	6.89	0.49	272	6.81	0.63	26	-0.086	0.51
Age (years)	28.35	6.64	255	30.50	7.84	26	2.147	0.19
Tenure (years)	1.27	1.21	272	1.59	2.22	26	0.314	0.58
Big 5 score /5	31.33	4.35	272	32.81	4.27	26	1.477	0.07
Monthly salary in USD	359.68	336.90	251	377.21	307.84	22	17.535	0.80
English score %	38.38	17.53	272	35.08	16.55	26	-3.294	0.43
Ever taken English lessons	0.69	0.46	272	0.69	0.47	26	-0.003	0.98
Treatment	0.53	0.50	272	0.35	0.49	26	-0.187	0.15
Taken English lessons since joined	0.31	0.46	272	0.31	0.47	26	0.003	0.97
Involvement score 1-4	2.27	0.85	272	2.44	0.93	26	0.170	0.51
BvR Management score /5	9.13	1.64	272	9.62	1.68	26	0.493	0.29
Effective time (%)	72.81	25.23	262	76.44	31.82	22	3.628	0.67
Talk Freq. FM 1-4	2.45	0.90	264	2.50	1.01	22	0.053	0.73

The F-stat of joint significance for these 13 variables to predict endline response status is .91

back

Post-endline Attrition

	Responders			Non-responders			Difference	
	mean	sd	N	mean	sd	N	Diff	p
Share Male	0.37	0.48	219	0.43	0.50	79	0.061	0.28
Education (years)	6.89	0.50	219	6.87	0.52	79	-0.017	0.78
Age (years)	27.86	5.76	206	30.44	8.75	75	2.576	0.08
Tenure (years)	1.21	1.21	219	1.55	1.59	79	0.338	0.21
Big 5 score /5	31.43	4.23	219	31.54	4.70	79	0.115	0.83
Monthly salary in USD	329.81	279.57	203	451.81	447.34	70	121.999	0.12
English score %	37.52	17.21	219	39.66	18.11	79	2.140	0.44
Ever taken English lessons	0.73	0.44	219	0.59	0.49	79	-0.136	0.08
Treatment	0.54	0.50	219	0.46	0.50	79	-0.083	0.18
Taken English lessons since joined	0.32	0.47	219	0.27	0.44	79	-0.054	0.46
Involvement score 1-4	2.28	0.85	219	2.31	0.90	79	0.033	0.82
BvR Management score /5	9.12	1.56	219	9.30	1.88	79	0.179	0.53
Effective time (%)	72.93	24.43	212	73.56	29.48	72	0.632	0.89
Talk Freq. FM 1-4	2.44	0.90	214	2.49	0.93	72	0.047	0.67
Endline non-response	0.00	0.00	219	0.33	0.47	79	0.329	0.00

The F-stat of joint significance for these 14 variables to predict endline response status is 8.27

back

Takeup and Response Rates

Status	Pre-treatment	Post treatment	Takeup any	Takeup 50%	Takeup 75%
Control	144	129	0	0	0
Treatment	154	146	124	109	72
Total	298	275	124	109	72

Salary, Quits, Job Applications

	Log salary		Left SEZ company		Applications	
	ITT (1)	TOT (2)	ITT (3)	TOT (4)	ITT (5)	TOT (6)
Treatment	0.014	0.024	-0.029	-0.049	0.218	0.368*
	(0.043)	(0.068)	(0.051)	(0.079)	(0.138)	(0.220)
Baseline wage control	Yes	Yes	Yes	Yes	Yes	Yes
Strata FEs	Yes	Yes	Yes	Yes	Yes	Yes
Control Mean	5.97	5.97	0.26	0.26	0.54	0.54
1st stage F-stat		223		285		286
R2	0.72	0.72	0.22	0.23	0.17	0.17
N	217	217	247	247	271	271

Data from multiple surveys and admin data. Controls included for source and survey round. Wages specification in long format with two observations per DM.

Model Preliminaries

DM and FM, 2 periods (no discounting)

Production:

- DM produces output $\theta(\chi, \kappa)$
    - χ: DM-FM communication ($\theta_\chi > 0$)
    - κ: DM's management knowledge ($\theta_\kappa > 0$)
    - $\theta(\chi, 0) = \chi$ and $\theta(0, \kappa) = \kappa$

Communication:

- Communication with FM is $\chi = 2\sqrt{\lambda \tau}$,
    - $\lambda \geq 0$ DM's proficiency in foreign language
    - $\tau \geq 0$ communication effort of FM
- Language ability complementary w/ communication

Learning:

- DMs learn general mgt skills through communication
    - $t = 1$: mgt knowledge normalized to $\kappa_1 = 0$
    - $t = 2$: $\kappa_2 = 2\phi\sqrt{\lambda \tau_1}$

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Timing

$t = 0$

   – DM buys language λ at unit price c, effort cost $\frac{\lambda^2}{2}$

$t = 1$

   – FM offers a wage w to DM

   – FM profit is $\theta(\chi, 0) - \gamma\tau - w$, DM payoff is w

      ▶ FM chooses comm effort τ at cost $\gamma(\tau) = \gamma\tau$

   – If DM rejects, FM profit is 0 and DM payoff is w_0

$t = 2$

   – DM payoff is output $\theta(0, \kappa_2) = \kappa_2$

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Private Equilibrium

Backward induction:

- $t = 2$: DM's payoff $2\phi\sqrt{\lambda\tau}$
- $t = 1$: FM sets τ to maximise her profits $2\sqrt{\lambda\tau} - \gamma\tau - w$
- $t = 0$: DM chooses λ to maximise two-period payoff: $2\phi\sqrt{\lambda\tau} + w - \left(c\lambda + \frac{\lambda^2}{2}\right)$

Equilibrium

$$\lambda^* = \frac{2\phi}{\gamma} - c \qquad \tau^* = \frac{1}{\gamma^2}\left(\frac{2\phi}{\gamma} - c\right)$$

Social Optimum

Social planner:

$$\max_{\lambda, \tau} \underbrace{2\phi\sqrt{\lambda\tau}}_{\text{DM prod in } t = 2} + \underbrace{2\sqrt{\lambda\tau}}_{\text{DM prod in } t = 1} - \underbrace{\gamma\tau}_{\text{Cost of comm}} - \underbrace{\left(c\lambda + \frac{\lambda^2}{2}\right)}_{\text{Cost of language skills}}$$

Equilibrium

$$\lambda^{\mathsf{SP}} = \frac{(1+\phi)^2}{\gamma} - c > \lambda^* \qquad \tau^{\mathsf{SP}} = \frac{(1+\phi)^2}{\gamma^2}\left(\frac{(1+\phi)^2}{\gamma} - c\right) > \tau^*$$

Divergence due to non-contractibility of communication ($w \perp \tau$)

- FM doesn't internalize returns to communication in $t = 2$
- DM private returns to λ are depressed because τ is inefficiently low

Language Subsidy

Due to non-contractibility, planner cannot increase communication directly

Consider language subsidy s

Planner's programme:

$$\max_s 2\phi\sqrt{\lambda\tau} + 2\sqrt{\lambda\tau} - \gamma\tau - \left((c-s)\lambda + \frac{\lambda^2}{2}\right) - s\lambda$$

$$\text{s.t.} \begin{cases} \tau = \frac{\lambda}{\gamma^2} & \text{(IC FM)} \\ \lambda = \frac{2\phi}{\gamma} - (c-s) & \text{(IC DM)} \end{cases}$$

$$\lambda^{\text{subsidy}} = \frac{1}{2}\left(\frac{1+2\phi}{\gamma} - c\right) \qquad \tau^{\text{subsidy}} = \frac{1}{\gamma^2}\left(\frac{1+2\phi}{\gamma} - c\right)$$

$$\lambda^* < \lambda^{\text{subsidy}} < \lambda^{SP} \qquad \tau^* < \tau^{\text{subsidy}} < \tau^{SP}$$

Complementarity: $s \Rightarrow \uparrow \lambda \Rightarrow \uparrow \tau \Rightarrow$ language subsidy partially corrects inefficiency

– So far we have assumed ($w \perp \lambda$), can be relaxed and subsidy helps if $w'(\lambda) < 1/\gamma$ back

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