

Language Barriers and Knowledge Transfers in MNCs: Experimental Evidence *

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Abstract

We identify an impediment to knowledge transfers to domestic managers within MNCs: language barriers. A typical foreign affiliate is led by foreign managers (FMs) who supervise domestic middle managers (DMs) who in turn supervise domestic production workers. In our setting—foreign firms operating in Myanmar—communication between FMs and DMs occurs in English, yet the typical DM possesses only elementary English knowledge. Motivating evidence and anecdotes suggest that this communication barrier reduces the DMs’ acquisition of management knowledge. We develop a model of such organizations in which communication between FMs and DMs increases knowledge transfers. The model reveals that when (i) knowledge transfers are valued in the labor market but (ii) communication is non-contractible, knowledge transfers are left unrealized despite their value. Two experimental protocols test the model assumptions and predictions. The first provides English training to a random sample of DMs. At endline, the treatment group has higher English knowledge, more frequent communication with their FMs, and perform better in simulated management exercises. The second protocol recruits a sample of human-resource managers at firms outside our main sample, and asks them to rate potential job applicants who randomly differ in their characteristics. Employers value applicants with both FDI experience and higher English knowledge, and, additionally, when applicants report frequent communications with FMs. Additional survey evidence supports the non-contractibility of communication with FMs and, thus, under-investment in English by DMs.

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1 Introduction

Multinational companies (MNCs) generate a large share of global economic activity. In 2018, foreign direct investment (FDI) flows were \$1.8 trillion, 35% of which were invested in developing countries (UNCTAD 2018). Multinationals are more productive, have superior technology, and are better managed than domestic firms (e.g., Bloom et al. 2012b, Antràs and Yeaple 2014), and developing countries routinely provide large subsidies to attract foreign firms hoping that their physical presence generates positive spillovers. However, spillovers are not guaranteed and while some studies detect evidence (Smarzynska Javorcik 2004, Alfaro-Urena et al. 2019) others have not (Aitken and Harrison 1999, Harrison and Rodriguez-Clare 2010). Despite this mixed evidence, governments around the world, particularly in developing countries, want to know not only how to attract MNCs but how to maximize their potential spillovers

In this paper, we focus on knowledge transfers to domestic middle-managers working inside MNCs. Our setting is a sample of workers and firms operating in Myanmar’s largest special economic zone (SEZ). Pilot surveys revealed that learning management is a primary motivation for working at the SEZ, despite its considerable distance from residential areas in Yangon. However, qualitative and quantitative evidence reveal that language barriers inhibit learning: substantial time, resources and information are, quite literally, “lost in translation.” This is because DMs’ English knowledge is low: roughly two-thirds of the DMs working at the MNCs have, at best, elementary knowledge of English.¹ Correlations suggest that when DMs’ English knowledge is higher, they report more frequent communication and learning more management skills from their FMs.

Language barriers are not unique to our setting. A defining feature of MNC organizational structures—particularly in developing countries—is that foreign affiliates are led by foreign expatriate managers (FMs) who supervise domestic middle managers (DMs) who in turn manage the (domestic) production workforce. Antràs et al. (2008) argue that middle-level managers could play a key role in alleviating communication frictions between the top and bottom organizational layers within MNCs. However, these frictions will be large when FMs and DMs cannot communicate in their native languages. In our setting, communication within the MNCs occurs in English, and the English levels of DMs is low. In other setting, such as in Chinese MNCs operating in Africa, communication often occurs in Mandarin.

These motivating facts help formulate a model to answer an industrial policy question: do language barriers generate an inefficiency that justifies policy intervention? Since it is costly for DMs to learn a foreign language, language barriers do not automatically imply a market failure. Moreover, MNCs should anticipate such frictions when deciding which markets to enter.² Our model clarifies an answer this question. Even when DMs and FMs are fully rational and operate

¹A test of DMs English ability suggests that the average DM is at the A2 language level based on the ratings by the Common European Framework of Reference for Languages.

²A survey article by Blonigen and Piger (2014) argues that common language is, *ceteris paribus*, associated with a twofold increase in FDI flows, a magnitude that vastly exceeds the responsiveness to tax exemptions.

within perfectly functioning credit and English-training markets, there can be an under-supply of communication between organizational layers. This occurs when (i) management knowledge gained from FDI experience is valued in the domestic labor market and (ii) communication between FMs and DMs is non-contractible. This leads to sub-optimal levels of communication within the MNCs, and hence, lower management transfers from FMs to DMs.³ We assess the model assumptions and predictions through two experimental protocols and additional surveys.

The first experiment tests the comparative statistic that lowering language barriers should improve FM-DM communications and that DMs management performance should improve. To do so, we provide a free 48-hour English training course to a random sample of DMs employed at the 30 MNCs in our sample. The ITT on English proficiency is $0.15sd$, confirming the efficacy of the English training. At endline, treatment DMs report more frequent communication with their FMs, with the ITT estimate on frequency being $0.30sd$, consistent with the model’s prediction that lower communication frictions should lead to more communication. We develop a series of simulation exercises in a bilingual setting to measure management performance among treatment and control DMs. An enumerator simulates the role of an FM by giving management instructions to the DM in English. The DM then manages two Myanmar-speaking enumerators to complete a task. The results indicate that productivity among the treatment DMs—as measured by the time spent supervising and executing the task—is higher than control, and, consistent with model predictions, treatment DMs spend more time asking questions (in English) to the acting FM.⁴ Together, the experimental results provide a causal interpretation to the motivating facts and suggests that reduced communication frictions improve interactions between DMs and FMs and raises their efficiency.

We next examine the conditions under which language barriers could generate sub-optimal communication, and hence, lower knowledge transfers. We first establish condition (i): management knowledge acquired at MNCs is highly valued in the domestic economy. We recruit a sample of 51 human-resource managers who work at firms outside of our main sample to rate hypothetical resumes of potential job applicants for managerial positions at their companies. These HR managers regularly review resumes from applicants with both MNC and domestic experience and are able to assess the quality of hypothetical applicants that vary (randomly) in their characteristics. Not

³This implication has a subtle but important difference from standard frameworks of vocational training, which typically are not modeled as transmitted through hierarchies within firms (Acemoglu and Pischke, 1998). In the standard model, English is a “general skill” and there is thus no incentive for the foreign firm to invest in it. In a Beckerian framework for general training, the worker will have an incentive to invest. Under-investment thus typically arises if there are frictions in the training market, e.g., due information asymmetry or to credit constraints (Acemoglu and Pischke, 1998). In our model, instead, we assume that the market for English training is perfect and highlight how the complementarities between the non-contractible communication and the language skills lead to under-investment in (English) training.

⁴The management simulation was halted approximately mid-way through our endline collection because of the onset of mandated Covid-19 lockdown, and we perform power calculations that extrapolate the findings had we completed the simulation measurements. Additionally, since the SEZ was opened only in 2015, our low sample size reflects the smaller number of firms in operations when we performed the baseline survey. At present, there are 111 FDI firms in operation, and we perform power calculations had we had access to the current population of firms when the project commenced.

surprisingly, HR managers place a large premium (both in their choice and in their wage offer) on applicants with English knowledge, but this premium is particularly large for applicants reporting previous work experience at MNCs. The magnitude is comparable to applicants that have an additional two years of work experience, an attribute that HR managers consistently rank as the most important factor in hiring decisions. An alternative explanation could be that applicants with MNC experience and good English knowledge simply reflect selection on unobserved attributes. To rule this out, we implement a second rating exercise where HR managers choose applicants based on hypothetical answers to interview questions. In this block, the hypothetical candidates are all fluent in English and are currently employed in a MNC. We randomly vary whether or not the applicant has frequent interactions with their FM, was supposed to have frequent interactions but did not for exogenous reasons, is involved in setting targets in their previous firm and their knowledge of Microsoft Office (a hard skill). Applicants who have frequent interactions with FMs are more likely to be chosen over applicants who were selected but did not interact with FMs. The premium on the frequent communication with FMs is as large as the applicant’s knowledge of the hard skill.

A direct test of condition (ii)—communication between FMs and DMs is non-contractible—is harder but survey evidence lends support to this assumption. At endline, we surveyed DMs willingness to pay to for additional one-on-one interactions with their Myanmar bosses, their FM, and a hypothetical FM at another company (to disentangle learning from “schmoozing” with one’s own FM). Treated DMs (those assigned to receive English training) report a higher willingness to pay to interact with their FMs and (to a lesser extent) the hypothetical FM at another company. Although not incentivized, this finding suggests that lower communication frictions expands the wedge between the amount of communication desired by DMs and the amount of communication provided by FMs. We fail to detect any differential effect between treatment and control in their willingness to pay to communicate with their Myanmar bosses.

Our paper bridges three distinct literatures. First, we contribute to the analysis of multinationals and FDI spillovers. A large literature has studied the consequences of FDI on developing countries; see the comprehensive survey by [Harrison and Rodriguez-Clare \(2010\)](#). Evidence for positive FDI spillovers has proven elusive, possibly because the truth is actually mixed or because measurement and identification challenges make spillovers difficult to detect. Studies in this literature typically extract measures of productivity from standard administrative datasets which have measurement issues ([De Loecker and Goldberg, 2014](#)) and need to overcome potential non-randomness in the timing and location of FDI inflows. These studies focus on the ultimate spillovers to domestic firms and workers, for example through supply-chain linkages (e.g., [Aitken and Harrison 1999](#), [Smarzynska Javorcik 2004](#), [Alfaro-Ureña et al. 2019](#)) or through wages (e.g., [Balsvik 2011](#), [Poole 2013](#)). A separate and largely theoretical literature has analyzed the organizational structures of MNCs; see the comprehensive survey by [Antràs and Rossi-Hansberg 2009](#). Building on [Garicano \(2000\)](#), [Antràs et al. \(2006\)](#) model the formation of cross-country hierarchical production teams with less skilled workers specialized in production and more skilled workers specialized in problem solving (see also [Caliendo and Rossi-Hansberg 2012](#)). Our paper connects these two

branches by emphasizing that communication frictions within MNCs may inhibit the transfer of management knowledge. This idea is related to the theoretical model developed by [Antràs et al. \(2008\)](#) where MNCs create a middle-management layers in host countries to reduce the costs of transmitting knowledge across borders. Our survey and experimental evidence reveals that internal communication frictions are indeed large and occur, in our setting, between the top and middle management layers.⁵

Our paper contributes to the literature on management practices (e.g., [Bloom and Van Reenen 2007](#), [Bloom et al. 2012b](#)). This literature uncovers two findings that motivate our work. First, firm performance correlates quite strongly with the quality of management practices, which indicates that good management practices diffuse slowly as they are hard to codify and transmit (e.g., [Gibbons and Henderson 2012](#), [Bloom et al. 2016](#)). Second, multinational firms are better managed ([Bloom and Van Reenen, 2007](#)). These facts suggest that employment of domestic middle-managers at foreign firms could be a potent diffuser of best management practices in developing countries.⁶ Our setting reveals that communication frictions arising from language barriers could dilute such knowledge transmission.⁷

Finally, we contribute to the literature that evaluates consulting and management training in large firms that operate in developing countries (e.g., [Bloom et al. 2012a](#), [Macchiavello et al. 2015](#), [Alfonsi et al. 2020](#)). Rather than directly offering specific types of management consulting or training interventions, we instead focus exclusively on removing communication frictions between domestic middle managers and foreign bosses. The idea here is that management knowledge can be learned from the direct interactions with superiors from within an organization.

The paper is structured as follows. Section 2 describes the setting and facts that motivate the model and experimental protocols. Section 3 describes the model. Section 4 describes the language experiment that tests the comparative statics of the model. Section 5 assesses the key assumptions of the model. Section 6 concludes.

2 Setting & Motivating Evidence

This section describes our setting and the quantitative and anecdotal evidence that motivates studying language barriers within MNCs.

⁵In settings where middle-managers are bilingual—which is more likely to be satisfied in high human capital countries or host countries with shared ties with the MNC country—language barriers would obviously not be an important barrier to consider. In Myanmar, however, overall English levels are extremely low despite the country being a former British colony. In our sample, firms hire, on average, 2.3 translators to come to the factory for 1.5 per day. Part-time translation services are very expensive, with a daily wage of nearly 5 times higher than the average middle manager wage.

⁶For example, [Giorcelli \(2019\)](#) shows that management training trips for Italian managers to US firms had positive lasting productivity impact on participating Italian firms.

⁷In a related example, [Atkin et al. \(2017\)](#) show that technology adoption can also be slowed by communication frictions—due to incentive problems rather than language barriers—inside firms.

2.1 Setting and Data

Following a political coup in 1962, Myanmar closed off and spent nearly 5 decades isolated from global trade and foreign investment. Beginning in 2010, the military-backed government agreed to transition towards democratic rule, and a few years later, the country initiated economic reforms to re-integrate into the global economy by removing trade barriers and implementing new regulations to attract FDI. These reforms have been successful and average annual FDI inflows between 2010-19 was \$2.6 billion compared to just \$0.4 billion in the previous decade (UNCTAD). Roughly 80% of FDI inflows originate from East and South-East Asia (Myanmar Directorate of Investment and Company Administration).

The 2014 Special Economic Zone Law was a key component of the country’s economic reforms; it established the regulatory framework that governs the country’s SEZs.⁸ Our main analysis focuses on firms operating in the most prominent of the zones, Thilawa SEZ, which opened in September 2015. Firms operating in the zone receive the usual benefits associated with SEZs: tax breaks, duty drawbacks on imports used for exports, and high-quality infrastructure (roads, easy access to a wet and dry port, electricity, and water).⁹

In 2016-17, we implemented a pilot surveys and interviews to learn about the potential spillover channels from the MNCs to domestic workers and firms. At that time, 46 firms were operating at the SEZ, and we were able to administer surveys at 36 firms. Table 1 reports summary statistics of these firms from which we also gather the motivating evidence.¹⁰

2.2 Organizational Structures and Motivating Facts

Table 1 reports the organizational structure of the firms in our sample. The top layer is comprised of a small number—on average, 4.0—senior expatriate managers (FMs). FMs are responsible for coordinating with headquarter operations, setting the strategic direction for the Myanmar factory, and overseeing operations with the help of a middle-level management layer.¹¹ This layer is comprised of local Myanmar managers (DMs), with an average of 37.6 DMs at each company. The numbers imply that the span of control for the typical FM in our sample is around 10 DMs. The main responsibility of DMs is to manage production workers who typically work on an assembly line. The typical DM salary is USD \$330, which is about 20% of a typical FM salary, but roughly 3 times higher than production workers. Myanmar’s GDP per capita is roughly \$1400 per year. Communication between FMs and DMs occurs in English, which is the native language of neither

⁸Following their success in China, SEZs have become common tools to attract FDI and promote industrialization (see [Khandelwal and Teachout 2016](#)).

⁹Specifically, firms are exempt from corporate taxes, customs duties and other taxes for import of material inputs and capital goods for the first 5-7 years of operation, with subsequent discounts of around 50% in the succeeding years. Some firms are also further exempt from commercial taxes.

¹⁰Figures A.2 and A.3 compares the sample of 36 firms surveyed in the pilot to the current sample of 111 operational firms by sector and country of origin.

¹¹The typical FM relocates Myanmar for about 2.22 years before returning to their origin country.

group.¹² Pilot surveys and anecdotes revealed four key facts motivating language barriers as a challenge to DMs’ ability to learn management.

Fact 1: DMs Want to Learn Management Skills

Pilot surveys revealed that employees are keen to learn skills at MNCs. As shown in Figure A.4, DMs report learning new skills—and specifically management skills—as a primary reason to work at MNCs. While DM wages are higher relative to domestic firms, Appendix Figure A.5 indicates that wages are similar to wages at a sample of representative Myanmar firms in the 2014 World Bank Enterprise Survey. So, despite similar wages, DMs’ round-trip commute to the SEZ averages 144 minutes per day, suggesting that DMs appear to be willing to accept lower real wages for the opportunity to learn new management skills.

Fact 2: DMs English Language Ability is Low

Despite being more educated and better selected, in part, to communicate with FMs, English knowledge among DMs in our sample is low.

We hire two external consultants with knowledge of the Common European Framework of Reference for Languages (CEFR) scale, an international standard for describing language ability, to help devise a English test to assess proficiency. We administered the test to DMs. On the listening module, DMs were asked to answer 16 questions, in an increasing order of difficulty, until they answered two consecutive questions incorrectly. The speaking module asked DMs to answer simple questions in English about their work routine or career aspirations. Their answers were required to be at least 30 seconds long, and were graded by the two consultants.

Figure 1 reports the distribution of test scores among the DMs (and FMs). The average score among DMs is 47%, which corresponds to A2 (Elementary) on the CEFR scale.¹³ In contrast, the average FMs score is 62%, which corresponds to a CEFR category B1 and B2 (Intermediate and Upper Intermediate). An alternative survey that asked the company’s human-resource managers about language ability of DMs and FMs confirms that DMs ability is lower than FMs. Additionally, virtually none of the FMs know Burmese, and very few DMs are proficient in the native language of the FMs (Chinese, Japanese, Korean, depending on the firm); see Appendix Figure A.6.

Fact 3: Language Barriers and Learning Challenges

Language barriers between FMs and DMs appear to create challenges to learning. Pilot surveys revealed that out of every 60-minute meeting between FMs and DMs, on average, 33.8% of the

¹²Despite a British colony, English knowledge in Myanmar is low and the country ranks 86th on the EF English Proficiency—which lies in the category of “very low” proficiency—alongside neighboring countries Bangladesh, Cambodia, Sri Lanka and Thailand (see [EF Proficiency index](#))

¹³The cutoffs noted in the figure correspond to equivalent categories developed by CEFR. We assign these cutoffs as follows. As discussed below, a (random) subset of DMs took a separate English language test administered by the language training provider before the course began. The scores from the provider’s test can be mapped to directly CEFR categories. We match the DMs’ CEFR categories from that test to their scores on our test to obtain a correspondence between the two.

time is lost due to language barriers. Additionally, at these meetings, DMs report a low level of comprehension; they report understanding approximately 63% of the meeting if using Google translator and 84% if using an in-person translator.

Comprehension improves with access to two technologies, live translators and Google Translate; average comprehension rises to 62.9% with Google Translate and to 84.0% when a translator is present. Two caveats that limit widespread use of these technologies. First, the meetings when a translator is present are longer. Second, translators are expensive. Half of the firms in our sample do not hire translators. Those that do typically hire translators on a casual basis; conditional on hiring a translator, these firms typically pay translation services for, on average, 1.5 hours per day and the translator typically follows only the most senior FMs. Part-time cost approximately \$100 , respectively; this is above the typical daily DM wage of \$16. Third, Google Translate does not translate directly between Burmese and Japanese/Korea/Chinese, and so the translation quality, at present, remains low.

Several anecdotes support these motivating statistics. We provide a flavor of how (and why) learning may be impeded by communication frictions:

- *DM, Japanese firm A*: 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 B*: 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.
- *FM, Japanese firm C*: 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 D*: One problem is that it is difficult to teach Myanmar workers the details of their job due to language barriers.
- *DM, Korean firm E*: Synonyms had not come out from my mind to clarify the meanings of the words while having conversations with FMs.
- *DM, Korean firm F*: I asked FMs to repeat what they said for more than two times, and was afraid to speak with them.
- *DM, Thai firm G*: 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 H*: Listening was a problem while I was having job interview with Managing Director to join this company.

- *DM, Korean firm I*: I was afraid of writing email and I needed someone to check grammar and usage, besides my emails were long but ineffective
- *DM, Japanese firm J*: I needed to use English language in the workplace, I often checked my usages with internet.

Fact 4: Lower Communication Frictions Correlated with More Learning

The final fact that motivates our formal analysis is the finding that lower communication frictions between DMs and FMs is correlated with more communication and knowledge transfers. These results are simply correlations and serve as further motivation for the experimental interventions we present below.

To study this, we run the following specification that correlates outcomes of DM i with the English test score:

$$y_i = \alpha + \beta english_i + X_i' \delta + \epsilon_i \quad (1)$$

where $english_i$ is the standardized English test score at baseline and X_i is a set of controls, including demographics, position and department at the company.¹⁴ We consider three outcomes: log wage, self-reported involvement in plant operations (scale 1-4)¹⁵, and score on questions of best management practices (scale 1-15) following Bloom and Van Reenen (2007).

Table 2 reports the results. A 1 s.d. increase in the English score is correlated with a 0.15 higher wage, 0.12 more involvement (out of 4), and a small increase of 0.08 in management scores.

Of course, the coefficient on English in (1) may be biased. An imperfect solution to control for unobserved factors is to ask each DM about their communications with three direct superiors: a Myanmar manager (if application), and their two most direct FMs.¹⁶ This allows us to compare interactions with each superior while simultaneously controlling for a DM fixed effect through the following specification:

$$y_{ib} = \alpha_i + \beta_1 FM_b + \beta_2 (FM_b \times english_i) + \epsilon_{ib} \quad (2)$$

where α_i is a DM fixed effect, and b denotes the boss where FM_b takes a value of one if he is a foreign expat. We examine three outcomes: frequency of communication (scale 1-4), share of a typical conversation understood, and whether the boss has been important for the manager's learning (a binary indicator). For domestic bosses, the share of conversations understood is, naturally 100% since two individuals would be speaking in Burmese.

¹⁴The set of positions is: assistant, staff, officer, leader, assistant manager, manager, senior manager, accountant, supervisor, general manager, director and executive. The set of departments is: general management, accounting and finance, human resource, logistics, production, engineering, research and development, marketing and sales.

¹⁵The scale is: 1) "not involved at all", 2) "rarely involved", 3) "sometimes involved", and 4) "there is never a discussion without me, and I take the final call".

¹⁶We define the Myanmar supervisor or boss is defined as the individual who is directly above the DM in the firm's organizational structure. We define the FM as the non-Myanmar manager who is closest and above person closest to the DM.

The results of the regression are reported in columns 4-6 of Table 2. Relative to domestic bosses, DMs report less frequent communication, poorer comprehension, and less learning from their FMs. However, these interactions improve with DM's English knowledge: a 1 s.d. increase the DM's English test score is correlated with a higher frequency of communication, better comprehension, and a higher probability of learning management.

Overall, the evidence collected during pilot surveys suggest that DMs have low English levels, and that this language barrier may be impeding their learning of management skills by limiting the quantity and quality of interactions with FMs. This motivated a model of organizations where communication frictions impede knowledge transfers, and two experimental protocols to test this hypothesis.

3 Model

To fix ideas, this Section presents a model of an economy in which communication with FMs within MNEs potentially increases productivity of DMs. We have two goals in mind. First, the model emphasizes how there might be underinvestment in language knowledge in the economy. Language knowledge is a generic skill. In our model, underinvestment arises because of difficulties in contracting over the amount (or content) of communication between DMs and FMs. In particular, we assume that the training market is perfect and DMs can pay upfront for the costs of the training (i.e., we assume away market failures typically emphasized in the literature on general skill training). The model clarifies how underinvestment results when (i) language knowledge enhances the returns to communication effort, and (ii) learning acquired from communication with FMs is valuable in the domestic economy as well. Second, we use the model to conduct normative analysis. In particular, we are interested in exploring whether, to counter the inefficiency, a planner might want to subsidize english training in the economy.

3.1 Set Up

Agents: The economy is populated by three sets of agents:

1. A mass S of potential domestic production workers who supply unskilled labour. These workers have reservation utilities u , distributed with a cumulative function $L(u)$, with $L'(w) > 0$. A Worker supplies labour if the market wage w is higher than her reservation utility, i.e., $w \geq u$. The aggregate labour supply in the economy is thus given by $SL(w)$.
2. A mass F of ex-ante identical domestic managers (DMs). Each DM can run one production team of domestic production workers. Alternatively, DMs can manage teams in foreign owned firms.
3. A unit mass of foreign managers (FMs). FMs run firms which are collections of teams of production workers. To function, each production team requires one DMs supervising the production workers.

Timing: there are three periods:

t=0 DMs decide whether to pay cost c to learn foreign language.

t=1 FMs decide how many teams to run and hire production workers and DMs accordingly. They also decide how much effort to exert to communicate with DMs that run their teams. DMs decide between setting up their own firms, and hiring workers accordingly, or working for FMs.

t=2 Events are as in t=1.

Production: there is only one good produced in the economy. The price of this good at t=1 is normalized to 1. We now describe the production function of the different teams:

- Consider first production teams led by FMs. Each of these teams employ a DM i . The first time a DM works with a FM, the production function of these teams is given by $2\sqrt{1 + \lambda_i \tau_i} \sqrt{L_t^\lambda}$, where τ_i is the amount of communication effort chosen by the FM and λ_i depends on whether the DM has learned english in $t = 0$ or not. Communicating an amount τ_i with DM i costs the FM $\frac{\tau_i^2}{2}$.
- Consider now teams led by DMs i . The production function of these teams is $2\sqrt{1 + \phi \tau_i} \sqrt{L_t^{\phi_t}}$, where τ_i is the amount of communication effort that the DM has accumulated in previous periods from FMs.

We make the following Assumptions: **Assumption 1:**

- i) A FM that runs a firm with a mass E of teams incurs (management) costs $\frac{E^2}{2}$.
- ii) $\lambda_i = \lambda > 0$ if the DM has learned english at $t = 0$ and $\lambda_i = 0$ otherwise.
- iii) $\lambda = \phi$

Assumption i) introduces diseconomies of scope for the FM. It implies that, all else equal, stand alone teams are more efficient. Assumption ii) implies that english knowledge and communication with FMs are complement. The assumption that $\lambda_i = 0$ if the DM hasn't learned english in $t = 0$ simplifies the exposition. In particular, it implies that there is no return from communication effort with DMs that do not speak english. This implies that DMs that do not speak english also can't learn from FMs and, therefore, given Assumption i), in equilibrium do not work for FMs. Assumption iii) implies that DMs that have worked in $t = 1$ with FMs retain the entire learning from communication in the following period. Since FM suffer from diseconomies of scope, this implies that a DM that has worked for a FM in $t = 1$ will start her own firm in at $t = 2$. At $t = 2$, no DM works for the FM and the foreign firms dissolves.

Markets and Contracts: All markets are perfectly competitive. Since there are descreasing returns to scale, FM and DM make profits in equilibrium. The labour market is perfectly competitive as well and must clear in each period. We make the following Assumptions:

Assumption 2:

- iv) DMs can purchase english training at a price equal to constant unit production cost c .
- v) Communication effort τ_i is non-contractible.
- vi) Long-term labour contracts across periods are not enforceable.

Assumption iv) states that the market for English training is perfect. Assumption v), however, states that DMs and FMs cannot write enforceable contracts on the amount of communication. We take this as a fact of life within real world organizations. Since communication teaches management skills to DMs, the Assumption captures the idea that such skills are often tacit and difficult to codify and thus it would be impossible to write a contract forcing the FM to transmit a particular amount, or content, of good management practices. Assumption vi) implies that DMs cannot committ to work for two periods for the DM. Again, we take this as a fact of commercial life in most labour markets.

3.2 Equilibrium

We denote $E < 1$ the share of DMs who choose to learn English (DM^E) and $(1 - E)$ the share of DMs who do not learn English and set up their own firm in both periods (DM^o). Domestic managers DM^E who invest in the FM's language, are employed in period 1 in the foreign firm, managed by the FM, and receive wage w_1^E . The production process of the foreign firm is equivalent to having each of the DM^E manage their own firm, where each of these 'subfirms' is more productive than the firms set up by DM^o , by a factor $\sqrt{1 + \lambda\tau}$. λ represents the English level of DM^E , and τ represents the amount of communication the FM engages in with each of the DM^E , which comes at the cost $\frac{\tau^2}{2}$ for the FM. Each of these subfirms hire labour denoted by L_1^E . Because the FM has limited span of control, the cost of running these sub-firms is increasing in E , the share of the DMs who know the FM's language, and is given by $\frac{E^2}{2}$. Thus, in period 1, the foreign firm maximises the profit function given by:

$$\Pi_1^F(E, L_1^E, \tau) = E \left(\pi_1^E(L_1^E, \tau) \right) - \frac{E^2}{2}$$

$$\text{with } \pi_1^E(L_1^E, \tau) = 2\sqrt{L_1^E(1 + \lambda\tau)} - wL_1^E - \frac{\tau^2}{2} - w_1^E$$

In period 2, domestic managers DM^E who invested in the FM's language, run their own firms, which are more productive than the ones ran by DM^o by a factor $\sqrt{1 + \phi\tau}$, where τ is the amount of communication from the FM in period 1 and ϕ is a parameter describing the transfer of knowledge from the communication between the FM and the DM^E . Each of these domestic firms employ labour L_2^E and maximises the following profit function:

$$\pi_2^E(L_2^E) = 2\sqrt{L_2^E(1 + \phi\tau)} - w_2L_2^E$$

The total mass of these domestic firms in the economy in period 2 is E . In both periods, all firms produce a single good, which price we normalise to 1.

The decentralized equilibrium is fully characterised by the following 5 equations.

First, for $0 < E < 1$, DMs must be indifferent between investing in the FM's language or not, i.e. their surplus from learning the FM's language, being employed by the foreign firm in period 1 and setting up their own firm in period 2 with the knowledge acquired in the foreign firm must be the same as the surplus from not learning the FM's language and running a domestic firm in both periods. This non-arbitrage condition is given by:

$$w_1^E - c + \pi_2^E = \pi_1^o + \pi_2^o \quad (3)$$

Second, the labour market must clear in both periods. The two corresponding equations are:

$$L(w_1) = (1 - E)L_1^o + EL_1^E, \quad (4)$$

and

$$L(w_2) = (1 - E)L_2^o + EL_2^E \quad (5)$$

Third, maximization problems give us the demand for production workers in each firm at each period, which allows us to compute the endogenous profits; the optimal level of DMs hired by FMs and the optimal time spent by FMs talking to them in each team.

$$L_t^o = \frac{1}{(w_t)^2}, \quad L_1^E = \frac{1 + \lambda\tau^*}{w_1^2}, \quad L_2^E = \frac{1 + \phi\tau^*}{w_2^2},$$

$$E^* = \pi_1^\lambda \quad (6)$$

$$\tau^* = \frac{\lambda}{w_1} \quad (7)$$

Making two simplifying assumptions: $L(w_t) = w_t$ and $\lambda = \phi = 1$, we get that $w \equiv w_1 = w_2$ and $L \equiv L_1 = L_2$. Inserting into the labor market condition, this yields

$$E = w(w^3 - 1)$$

and solving for the optimal team numbers,

$$E = \frac{3}{2} \frac{1}{w^2} - c$$

We therefore have a unique equilibrium number of teams.

Proposition 1

- 1 Communication is increasing in the level English λ .
- 2 At $t = 2$ there are positive returns to English (and to experience in foreign Firms)

The RCT we present in the first part of the paper tests prediction 1, while the resume rating exercise we present in the second part of the paper tests prediction 2.

3.3 Welfare Analysis and Policy Implications

We now provide some basic analysis of the welfare properties of the decentralized equilibrium of this economy and discuss policy implications. We begin by highlighting two externalities that imply that the unique decentralized equilibrium differs from the allocation that would be chosen by a social planner with utilitarian social welfare function.

3.3.1 Inefficiencies

Holding labor fixed, an utilitarian planner chooses E and τ such that:

$$\begin{aligned} \max_{\tau, E} & E \left(2\sqrt{L_1^E(1 + \lambda\tau)} - w_1 L_1^E - \frac{\tau^2}{2} - w_1^E \right) - \frac{E^2}{2} \\ & + E \left(2\sqrt{L_2^E(1 + \phi\tau)} - w_2 L_2^E \right) + E(w_1^E - c) \\ & + (1 - E) \left(2\sqrt{L_1^o} - w_1 L_1^o \right) + (1 - E) \left(2\sqrt{L_2^o} - w_2 L_2^o \right) \\ & + w_1 L_1 + w_2 L_2 \end{aligned}$$

Making the same two simplifying assumptions as above, we obtain that

$$\tau^{SP} = \frac{2\lambda}{w} > \tau^*$$

and

$$E^{SP} = 6\frac{\lambda^2}{w^2} - c > E^*$$

Proposition 2 There are two externalities in the model:

1. FMs underinvest in communication τ because they do not reap the benefits of the learning.
2. DMs underinvest in learning English E because they do not reap all of the general equilibrium benefits of the increased efficiency of the economy.

3.3.2 Subsidizing English Training

to be added

4 Language Proficiency, Communication and Knowledge

This section presents the results of an experiment that attempts to reduce communication frictions by offering English language training to a random sample of DMs. The results test key predictions of the model: lowering frictions should improve communication with FMs and raise productivity.

4.1 Research design

In 2018, we recruited employees at the SEZ firms earning over \$200 per month, the income-tax reporting threshold in Myanmar. Pilot surveys suggested that it would be difficult to specify a precise definition of a manager, but also revealed that this threshold is a plausible lower bound for holding a management position and interacting directly with the senior FMs. This recruitment drive enrolled 298 domestic managers at 30 MNCs. We conducted a baseline survey of the DMs to record their language skills (English, native language of the FMs), frequency of communications with FMs, and their involvement and knowledge of management practices.

The experimental intervention is as follows. Within each firm (a stratum), we randomly assigned half of the domestic managers to attend a free English course. In total, 154 DMs were assigned to treatment. We contracted with an a high-quality English-language company to provide the language training, which were conducted by native English-speaking teachers. The course provided 48 hours of training and was conducted over 3 months, with two 2-hour sessions per week. Only DMs from the SEZ would participate in the classes, and the provider offered their existing content developed to teach English to managers (as opposed to, say, high school students). These sessions occurred after working hours and on weekends, and we offered DMs the option to take the course either at a rented space near the SEZ or at the company’s main office in downtown Yangon. The company’s standard procedure is to conduct an initial English assessment to determine the student’s knowledge and place students into an beginners or intermediate course. We allowed the company to follow this practice, and treatment DMs were assigned to one of two sections based on their initial English knowledge. Due to teaching capacity constraints, we could not train all the DMs simultaneously and had to stagger the training over 9 cohorts through 2019. The typical cohort had around 20 DMs.¹⁷

Throughout 2019, treatment and control firms were asked to answer short phone surveys that asked about interactions with FMs. Six to eight weeks after completing the course, we administered an endline survey and a management simulation exercise.¹⁸

Measuring the impact on management is difficult in this setting because the DMs perform a range of tasks at firms that span a range of sectors. Additionally, we are interested in capturing more than their management knowledge but also on actual management performance. We therefore created a management simulation to standardize the measurement of management performance across the sample. Importantly, this simulation also mimics an MNC organizational structure.

The simulation exercise was structured as follows. A single-blind enumerator with Advanced English proficiency acts as the foreign manager. This “FM” would provide instructions to complete a task to a DM from our sample. The DM would then manage two “production workers” (“PW”),

¹⁷The first cohort comprised DMs from just one company. All other cohorts had DMs from between up to 3-12 different companies.

¹⁸We surveyed the non-takeup treatment and control DMs based on when the treatment DMs from their company finished the course. In some cases, treatment DMs from the same company were assigned to different cohorts, and we opted to survey the non-takeup and controls DMs based on when the majority of the treatment DMs finished the course.

proxied by single-blind enumerators who were shielded from the “FM”-DM interactions so they could not hear the instructions. As is the case at the firms, the DM-“PW” interactions occurred in Burmese. We also implement a placebo simulation where the “FM” provides instructions in Burmese to the DMs; in this case, we should expect no differential impact on performance between treatment and control firms. We recorded the length of “FM”-DM and DM-“PW”, the number of questions, and the total mistakes completing the task.

The task simulates a common assembly-line task for production workers: precisely placing several items into a package. The task was to instruct the “production workers” to select 4 out of 8 objects, arrange them in a pre-specified order and place them in certain position in a box demarcated for shipping. The objects and orders were randomized across simulations to mitigate potential learning among the production workers. We shuffled the pair of production workers from a pool of 12 enumerators.

Due to the suspension of in-person surveys in Spring 2020 from Covid-19 lock-downs mandated by the Institutional Review Board, we also had to switch from in-person to phone surveys to collect the main endline variables for 145 of 298 DMs in the sample. We were unable to implement the management simulation on this sample, and we address this issue below.

4.2 Summary Statistics and Takeup

Table 3 shows baseline balance between the treatment and control individuals. The table reports the mean value of each variable for the treatment group, the control group and the difference between control and treatment means). 39% of individuals are Males across the sample. The mean age is in the control group is 28.2 years with a tenure of 1.3 years. The mean English score in the control group is 47%, which broadly corresponds to B2 on the CEFR scale. The average monthly salary is above \$300 (reflecting our recruitment of employees earning more than \$200 per month. With two exceptions, there are no statistical differences between treatment and control DMs. We can reject that the joint test for equality across all variables cannot be rejected at conventional levels. The final row of table reports attrition at endline (see the appendix for attrition for intermediary round). 9% of respondents did not take the endline survey, a low non-response rate which is not significantly different between treatment and control groups.

Figure A.7 reports uptake rates. 76% of treatment DMs attend at least one course. Our preferred measure of uptake is the fraction of DMs who attend at least three-quarters of the course (18 of out 24 sessions): 45%.

4.3 Empirical Specification

We estimate causal ITT impacts of treatment on DM i using a ANCOVA specification (McKenzie, 2012):

$$y_i = \alpha_f + \beta_{treat_i} + \gamma_{y0_i} + \phi_{mode_i} + \epsilon_i \quad (8)$$

The specification includes a firm f fixed effect, which reflects the stratification. We measure outcomes as the average value between time where 75% of the training has been completed and the endline. If an outcome was only measured at endline, we use just that value. The baseline value, y_{0i} , is the value at baseline (prior to treatment intervention). We also include a dummy if the endline was collected in over the phone because of the COVID-19 lockdown. Standard errors are clustered by each i 's main FM; there are 95 FMs across the firms.

We also present treatment-on-the-treated specifications (TOT) that scale the ITTs to reflect takeup:

$$y_i = \alpha_f + \beta \text{takeup}_i + \gamma y_{0i} + \phi \text{mode}_i + \epsilon_i \quad (9)$$

where takeup_i is one if the treatment DM attended at least 75% of the training (18 sessions out of 24 in total). We instrument takeup with the randomized treatment assignment.

For each outcome, we also present additional set of standard errors. As mentioned above, COVID-19 lockdowns prevented us from implementing the management simulation exercise on the full sample. In addition the standard errors based on the smaller sample, we also report standard errors that we may have achieved had we been able to implement the simulation exercise on all 30 firms. These are denoted in square brackets. Additionally, our limited sample size of 30 firms reflects the fact that only 46 firms had operations at the SEZ when the project began. At present there are 111 firms. We therefore provide standard errors based on power calculations had we been able to implement experiment on 90 firms (with 10 DMs per sample); these are denoted in curly brackets.¹⁹

4.4 Results

Table 4 reports the first-stage results that regress takeup on treatment. Column 1 defines takeup as attending at least one class while column 2 represents our baseline definition of attending at least three-quarters of the class. In this latter specification, the takeup rate is 45%.

Columns 3-8 report an alternative quasi-first stage estimate that examines the impact of the intervention on English proficiency. The results confirm that the English courses did, in fact, improve treatment DMs' English outcomes, an important result for the interpretation of the results. We administered a new version of the English test described in Section 2.2 at the endline.

Column 3 of Table 4 reports the impact on English test scores from being assigned to treatment: $0.15sd$. The TOT specification in column 4 shows an effect that is almost twice as large $-0.32sd$. The remaining columns separate the effects on speaking (columns 5-6) and listening comprehension (columns 7-8). The point estimates on speaking and listening are both statistically different from

¹⁹For the entire SEZ sample, 52% of DMs in each firm would be to assigned to treatment. The data is simulated as follows. We simulate the larger sample by drawing values of outcome variables from a normal distribution centered at 0 and the standard deviation of the variable; values for treatment DMs are drawn from the ITT estimate. We estimate ANCOVA for 6000 simulations and report the standard errors. Future versions will adopt a bootstrap procedure that draws from the empirical distribution of each outcome.

zero at the 10% level. Thus, the English training appears to have successfully improved the English ability for treatment DMs.

The next set of results examine DMs communications with FMs. The first panel in Table 5 reports the impacts on communication frequency. Treatment DMs increase their communication frequency by 0.21 from a baseline average value of 2.58. The TOT coefficient, reported in the second column, is naturally larger at 0.42 and is statistically significant at the 5% level. As a placebo check, we asked their communication frequency with respect to their closest domestic superior, and reassuringly find no change in these interaction frequencies (the effect size is a small negative coefficient and very noisy).

Table 6 reports the results of the management simulation. The first set of results report the “PW” time to complete the task when managed by the treatment DMs relative to controls DMs. Production teams managed by treatment DMs performed the task 0.19 minutes faster relative to the control mean of 1.28, suggesting about a 15% improvement in productivity. The TOT is 0.37 minutes faster. However, despite this shorter time, mistakes were no different between treatment and control (columns 3-4).

Why did performance improve for treatment DMs? Columns 5-6 offers a mechanism. We find that treatment DMs spend more time talking with the “FMs” when receiving the instructions. Column 5 indicates that treatment DMs spend 0.351 more minutes relative to the control mean of 1.89; and, the TOT estimate is 0.675. The reason for this additional time is because treatment DMs ask more questions: on average, treatment DMs ask 1.03 additional questions (and the TOT estimate is nearly 2 additional questions). This suggests that treatment DMs have more meaningful interactions with the “FM”. They spend more time talking and treatment DMs are more likely to clarify questions about the task.

We are concerned about a Hawthorne effect where treatment and control DMs behave differently in the simulation. (We are not concerned about the enumerators behaving differently, as they were blinded on which DMs were in the treatment group). For each DM, we re-ran the simulation exercise where the “FM” gave the orders (for an alternative randomly drawn task) to the DMs in the native Burmese language. These results are reported in Panel B of the table. We observe no difference between treatment and control DMs in this placebo simulation.

5 Are Knowledge Transfers Inefficiently Low?

While the results suggest that lowering communication frictions are beneficial, learning a new language is costly. The evidence thus far does not yet support a justification for policymakers to intervene, as both DMs may be behaving rationally in deciding their optimal level of English. Likewise, MNCs should internalize the level of operational inefficiencies from language barriers when deciding where to locate production.

The model clarifies that inefficiencies could arise if two conditions are met: (i) knowledge transfers are valuable in the domestic economy, and (ii) communication between FMs and DMs is

non-contractible. This section explores the plausibility of these two assumptions in our setting.

5.1 Value of Knowledge Transfers from MNCs

5.1.1 Research design

We assess the value of knowledge transfers from MNCs by eliciting the demand for such skills. To do so, we recruited a sample of Myanmar HR managers to rate hypothetical resumes of job applicants to their companies. The use of hypothetical resumes is based on [Kessler et al. \(2019\)](#).

The HR managers are currently employed at firms located outside of the SEZ. Table A.1 reports summary statistics of the sample. Roughly 60% of the managers work at Myanmar companies, and, as HR managers, they have experience in screening resumes. The typical manager reports screening roughly 450 resumes in the past six months and hiring about 60 new employees. They have experience hiring employees previously working at MNCs, and, on average, they have three years of work experience at MNCs.

The sample was asked to complete an online survey that elicited their preferences on a random set of hypothetical resumes. The respondent was shown a pair of candidate profiles and asked to select: a) which candidate they preferred; b) a wage they would offer; c) how much they think the candidate would have learned at the previous job (1-10 scale); d) how much involvement in management they think the candidate would have been at the previous job (1-10 scale).

Candidate profiles were created by randomly drawing values from the characteristics reported in panel A of Table 7. The respondent was told that the potential job applicants all graduated from the same university (Yangon University of Economics) with the same degree (Bachelors in Business Administration) and lived in Yangon. They were all applying for a general management position at the company. What varied was the set of characteristics of each applicant: gender, age, English ability, previous job at a domestic or Japanese, previous company size, work experience.²⁰ Each respondent was asked to rate 20 pairs of profiles.

In the second block of the survey, respondents was shown a new pair of candidates that varied in their hypothetical responses to potential interview questions. Respondents were asked to choose their preferred candidate among the two and how much that candidate would have learned from the previous job.

This second block was designed to test the communication friction mechanism. As before, the applicants were from the same university, degree and lived in Yangon. In addition, applicants were all of the same age (26), the same gender (Male), same experience at a foreign company (3 years at a 125 employee sized Japanese company), and had Advanced English skills as did their foreign boss. What differed was their response to three questions: 1) “How often did you interact with your foreign boss (formal/informal meetings, over lunch, etc.”; 2) “How frequently did you use Microsoft Office Package (Word, Excel, PowerPoint); and, 3) “How often were you involved in setting and

²⁰We allowed the age—either 25 or 26—to vary to mitigate the respondents focusing only on the other attributes, but kept the range narrow to increase power.

communicating the company’s targets”. The values to these three questions were drawn from the list noted in Panel B of Table 7.

The first question was designed to elicit the importance of communication with FMs. The possible values were “frequently”, “infrequently”, and “I was hired to interact frequently with the foreign boss but interacted infrequently because he had to leave the country for a family emergency”. We were concerned that respondents who saw candidates with frequent communication with FMs may conflate treatment effects of communication with selection effects. It could be that the applicant was *chosen* to interact with FM based on unobserved attributes. This last value indicates the applicant was chosen to communicate frequently with the FM but ultimately did not for exogenous reasons.²¹ The second question introduced knowledge of a hard skill. The third question introduced how involved the applicant was at the previous job. In this block, each respondent was asked to rate 11 pairs of profiles.

5.1.2 Empirical Specification

Each respondent r was shown a pair of profiles and we assess their choices through the following specification:

$$y_{rc} = \alpha_r + \alpha_{p(c)} + \sum_k \beta_k x_{kc} + \epsilon_{rc} \quad (10)$$

where x_{kc} are the characteristics of candidate c (randomly drawn for each respondent). Recall that each respondent is shown two profiles at once and asked to select among the two; we therefore include a resume-pair fixed effect $\alpha_{p(c)}$. Additionally, since respondents scored many pairs of profiles, we can include a respondent fixed effect α_r . Standard errors are clustered by respondent.

5.1.3 Results

The first column of Table 8 reports the regression results in the first block where respondents were asked to select their preferred candidate among pairs of profiles.

Column 1 reports the results of the chosen profiles. Not surprisingly, higher English ability have a 0.49 higher probability of being chosen relative to profiles with elementary English ability (the average ability among the sample of DMs from Section 4). Candidates with experience in MNCs are also much more likely to be chosen. Moreover, profiles with both high English proficiency *and* MNC experience are 0.72 more likely to be chosen. This suggests an interaction effect of language ability and experience working at a MNC.

The rest of the characteristics serve as useful comparison to place these magnitudes in perspective. Gender and age do not appear to have any effects; the age result is not surprising since the range was deliberately chosen to be small. Company size and work experience do matter. A profile working in a large firm (125 employees) is 0.36 more likely to be chosen relative to a candidate

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at a small firm (25 employees). The returns to experience is also large: profiles with 3 years of experience are 0.55 more likely to be chosen than profiles with one year of experience.

Column 2 reports the results of the wage offers for each profile. The results are consistent with the choices. Wage offers are higher to profiles with better English ability, experience at MNCs, experience at large companies, and more work experience. Candidates with better English ability and MNC experience receive a differentially higher offer; their wage premium is larger than the sum of the premia for English (\$45.10) and for an FDI experience (\$29.64). The numbers suggest that potential employers place a differential value on experience acquired in an FDI firm when the individual speaks English.

Column 3 reports the results for “how much do you think the candidate has learned in their previous job” on a scale from 1 to 10. Respondents find that overall work experience is the most important driver of learning, but we again observe a differential predicted learning for profiles with high English ability and MNC experience.

Finally, the last column reports the respondent’s perception of how involved in management decisions, on a 1 to 4 scale, the profiles would have been at the previous job. To confirm that this response is meaningful, we again find that profiles with more experience are more likely to be perceived as learning at the previous job. Additionally, respondents perceive profiles with higher English ability to be more likely to be involved in management. However, there is a low perception of involvement for low English profiles. In fact, this is no different than low English profiles at domestic companies (the leave out). This is consistent with the evidence above that involvement at MNCs hinges on language ability. Candidates with high English ability and MNC experience are perceived to be more involved in management.

The second block of the survey presents profiles to examine the mechanism for why profiles with high English proficiency *and* MNC experience are particularly valued. Table 9 reports these results by examining respondent choices among profile pairs that vary in their hypothetical answers to three questions: how frequently did the respondent communicate with their FM, how frequently did they use MS Office, and how frequently they were involved in setting company targets.

The first column reports the most desired answers. We observe that candidates who actively set company targets are most desired among these responses. Candidates who interact frequently with FMs are highly desired; they are 0.51 more likely to be chosen compared to candidates with limited FM interactions. They are also more likely to be chosen relative to candidates who frequently use MS Office. This suggests that for general management positions, potential employers desire candidates who worked closely with FMs even more than candidates with a “hard” skill.

One worry is that profiles that indicate frequent communications with FMs reflect an unobserved attribute of that applicant. To check for this possibility, some profiles that indicated that the candidate was chosen to interact with the FM, but ultimately did not do so for exogenous reasons. The coefficient on this characteristic is noisy and not statistically different from the leave-out category, limited interactions with FM. This suggests that the respondents value the impact of interactions with FMs as opposed to simply be chosen to interact with the FM.

Column 2 examines the wage offers by response. We observe a similar pattern. Profiles that indicate active involvement in setting targets at the MNC are offered higher wages. The wage offers to profiles who interacted frequently with the FM also offered higher wages, a similar value to profiles with the hard skill. We again observe no differential wage offer to the candidates who were simply selected to interact with the FM. The results for learning in column 3 follow a very similar pattern.

5.1.4 Outside Opportunities

The evidence from the HR manager ratings suggests that English and MNC experience are desired in the market. Moreover, potential interactions with FMs appear to be a part of the mechanism driving these preferences. At the endline survey on the sample of DMs, we recorded how many jobs they had applied for and if they had moved to another job. If the skills learned by treatment DMs are valued in the market, we should observe increases in the labor market opportunities.

We observe no difference in job exits between treatment and control DMs. Table A.2 also shows that treated DMs have not received more promotion or more raises than control DMs. This may be due to the fact that the endline occurred relatively soon after the English courses completed. Likewise, their wages are not differentially higher. However, we do observe that treatment DMs report applying to more jobs relative to the control group.

5.2 Non-Contractibility of Communication

We have shown that English training has a positive effect on various measures of communication and learning inside the firms. The latter was reported as valuable by the DMs before the experiment started. A puzzle is therefore why DMs do not pay for English courses themselves: at baseline, only 26% had ever taken an English course (96% were “potentially willing to take a course”). Of course, this may partly be due to reasons such as time constraints, cognitive costs of learning a new language, behavioral biases, and/or credit constraints (the course we offered for free cost about \$300/person which is about a month’s salary for the average DM).

We, instead, want to highlight a potential alternative story: the inability to contract on communication between DMs and FMs. Although DMs are motivated to learn from the FMs and they know that learning English would help them do this, they have no guarantee that the FMs will spend more time with them once they get better. On the contrary, due to a form of income effect, it could be that as communication between the FM and the DM becomes “cheaper”, it decreases, so that the FM can spend more time on other tasks.

In other words, the fact that the communication effort from FMs is non-contractible generates a form of hold-up that, in turn, leads the DM to under-invest in English. While it is inherently difficult to directly test for non-contractibility of communication, the model predicts that—as a result of non-contractibility—an increase in English knowledge increases the wedge between the amount of

communication desired by DMs (which include learning valuable in future jobs) and the amount of communication effectively provided by FMs (who only consider efficiency on the job).

To test this prediction, in the endline, we therefore asked DMs how much they would be willing to pay (WTP) for an hour of “one-on-one” conversation with a senior manager, either a FM or another DM (more senior than themselves). Table 10 shows that treated individuals are willing to pay \$33 more to spend an hour with the FM, an effect which is significant at the 5% level. The effect is more than twice as large when looking at the TOT: Treated DMs are willing to pay \$69 more than DMs in the control group to spend time with their FMs.

One concern is that difference between WTP for FM and DM across treatment and control can be accounted for by career concerns and not opportunities learning. In the second panel of Table 10 we therefore ask DMs for their WTP for a one hour conversation with a FM at a similar level from an outside firm. Control DMs are WTP less money to spend time with an FM if they’re outside their company (the control mean is \$27 as opposed to \$32), suggesting that it is considered less valuable, perhaps due to the lack of opportunities to ask for raises or promotions. However, treated DMs are still WTP to pay \$19 more than control individuals for this opportunity; this is suggestive that English skills develop a DM’s valuation for time with an FMs.

We included a placebo question which asked DMs about their WTP for a meeting with Myanmar boss (who is senior to the responding DM). The results are in columns 5-6 of Table 10, and we observe no differential reported WTP between treatment and control.

6 Conclusion

To add.

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Tables

Table 1: Summary Statistics

	Mean	Std Dev	N firms
Firms			
Total Employees	132.2	211.8	36
Foreign managers (FMs)			
Number	4.0	4.5	
Wage (USD)	1534	1062	
Domestic managers (DMs)			
Number	37.6	52.1	
Wage (USD)	329	466	
Production workers			
Number	85.4	161.9	
Wage (USD)	102.4	78	

Notes: Table reports summary statistics across the three layers in a sample of 36 firms at the SEZ. The data were collected through administrative data and a survey of employees prior to recruiting the sample for the language experiment.

Table 2: English Ability, Wages, Involvement, and Communication

	Across managers			Within managers		
	Log wage	Invt score	Mngt score	Talk Freq.	Understand %	Learn
	(1)	(2)	(3)	(4)	(5)	(6)
English Z-score	0.151 (0.028)	0.117 (0.048)	0.078 (0.035)			
FM				-0.934 (0.052)	-28.996 (1.202)	-0.180 (0.022)
FM \times Eng. Z-score				0.149 (0.053)	10.282 (1.365)	0.076 (0.022)
Dem. controls	Yes	Yes	Yes	Yes	Yes	Yes
Department FEs	Yes	Yes	Yes	Yes	Yes	Yes
Strata FEs	Yes	Yes	Yes	Yes	Yes	Yes
DM FEs	No	No	No	Yes	Yes	Yes
Mean of Dep. Var.	13.02	2.18	3.07	2.60	81.67	0.79
N	351	375	375	1039	1035	1125
R2	0.76	0.52	0.32	0.57	0.67	0.46

Notes: Table reports regression of DM outcomes on English test z-score (columns 1-3), and its interaction of an indicator for whether the supervisor is a foreign manager (columns 4-6). This sample is from pilot surveys that precede the language experiment enrollment. In the first three columns, the observations is equal to the number of DMs. Column 1 is the log monthly salary. Column 2 is the average of self-reported involvement (on a scale from 1 to 4). Column 3 a score of best management practices. The observations in Columns 4-6 are at the DM-boss level, where the boss could be Myanmar supervisor or a foreign boss. Column 4 is the communication frequency (1-4). Column 5 is the share of the conversation reportedly understood by the DM. Column 6 is a binary indicator of having learned management practices from the supervisor. Standard errors clustered by DM.

Table 3: Baseline Balance

	Control			Treatment			Difference	
	mean	sd	N	mean	sd	N	Diff	p
Share Male	0.38	0.49	144	0.39	0.49	154	0.008	0.90
Education (years)	6.87	0.45	144	6.90	0.56	154	0.035	0.61
Age (years)	28.16	6.45	134	28.90	7.06	147	0.741	0.05
Tenure (years)	1.33	1.16	144	1.34	1.38	154	0.006	0.95
Big 5 score /5	31.13	4.25	144	31.77	4.43	154	0.648	0.16
Monthly salary in USD	351.76	306.96	133	369.95	358.96	140	18.189	0.67
English score %	47.35	22.23	144	47.52	22.45	154	0.172	0.96
Involvement score 1-4	2.24	0.82	144	2.27	0.89	154	0.028	0.76
Management score /5	3.02	0.54	144	3.09	0.56	154	0.073	0.23
Understand FM %	77.74	21.19	140	78.02	20.95	150	0.281	0.89
Talk Freq. FM 1-4	2.55	0.88	138	2.36	0.93	148	-0.193	0.08
Endline attrition	0.12	0.32	144	0.06	0.24	154	-0.060	0.15
The F-stat of joint significance for these 11 variables to predict Treatment status is .99								

Notes: Table reports baseline balance on key DM characteristics. The last two columns show the difference of means between treatment and control.

Table 4: First Stage and Impacts on English Ability

	First stage		Overall		Speaking		Listening	
	(1) TOT once	(2) TOT 75%	(3) ITT	(4) TOT	(5) ITT	(6) TOT	(7) ITT	(8) TOT
Treatment	0.767 (0.035)	0.456 (0.040)	0.154 (0.079) {0.055}	0.320 (0.150)	0.187 (0.099) {0.067}	0.384 (0.187)	0.155 (0.114) {0.067}	0.324 (0.222)
Baseline value		No	Yes	Yes	Yes	Yes	Yes	Yes
Strata FEs		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control mean			-0.08	-0.08	-0.07	-0.07	-0.10	-0.10
1st st. F-stat				128.22		125.27		124.05
N	298	298	268	268	265	265	267	267
R2	0.65	0.37	0.48	0.48	0.46	0.47	0.30	0.30

Notes: Table reports first stage results of the instrumental variable regressions of takeup on assignment to treatment in Column 1 and 2. Column 1 defines takeup as attending at least one class, while Column 2 defines takeup as attending 75

Table 5: Impact of Treatment on Communication and Management Involvement

Panel A: Communication								
	Talk Freq. FM B 1-4		Talk Freq. DM A 1-4		FM in mtg (avg prob.)			
	(1)	(2)	(3)	(4)	(5)	(6)		
	ITT	TOT	ITT	TOT	ITT	TOT		
Treatment	0.212 (0.095)	0.424 (0.172)	-0.019 (0.088)	-0.038 (0.163)	0.067 (0.049)	0.140 (0.093)		
Baseline value	Yes	Yes	Yes	Yes	Yes	Yes		
Strata FEs	Yes	Yes	Yes	Yes	Yes	Yes		
Control mean	2.58	2.58	3.11	3.11	0.42	0.42		
1st st. F-stat		116.60		148.75		110.43		
N	226	226	258	258	260	260		
R2	0.29	0.28	0.17	0.17	0.29	0.29		
Panel B: Management								
	Invnt gal 1-4		Invnt people 1-4		Invnt target 1-4		Score KPI 1-4	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT
Treatment	0.045 (0.064)	0.093 (0.124)	0.111 (0.068)	0.230 (0.135)	0.056 (0.096)	0.116 (0.186)	0.030 (0.083)	0.063 (0.161)
Baseline value	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Strata FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	2.45	2.45	2.20	2.20	2.61	2.61	0.87	0.87
1st st. F-stat		127.44		129.20		126.79		132.28
N	277	277	277	277	277	277	272	272
R2	0.59	0.59	0.67	0.67	0.43	0.43	0.16	0.16

Notes: Table regresses measures of communication frequency on indicators for treatment, defined as the assignment to treatment which was randomly assigned within each strata (odd columns), or takeover, which is defined as having attended at least 75

Table 6: Impact of Treatment on Management Simulations

Panel A: Main results								
	Time worker		Mistakes worker		Time FM		Questions FM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT
Treatment	-0.190 (0.102) [0.111] {0.060}	-0.365 (0.188)	0.100 (0.277) [0.191] {0.104}	0.193 (0.490)	0.351 (0.183) [0.155] {0.085}	0.675 (0.350)	1.032 (0.399) [0.311] {0.170}	1.982 (0.751)
Baseline value	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Strata 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		61.39		61.39		61.39		61.39
N	153	153	153	153	153	153	153	153
R2	0.19	0.19	0.14	0.13	0.32	0.32	0.18	0.19
Panel B: Placebo results								
	Time worker		Mistakes worker		Time FM		Questions FM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT
Treatment	-0.014 (0.051)	-0.028 (0.090)	0.054 (0.085)	0.103 (0.152)	-0.014 (0.074)	-0.027 (0.130)	0.262 (0.192)	0.504 (0.362)
Baseline value	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Strata 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		61.39		61.39		61.39		61.39
N	153	153	153	153	153	153	153	153
R2	0.29	0.29	0.14	0.15	0.26	0.26	0.09	0.09

Notes: Panel A in Table regresses outcomes of the management simulation exercise on indicators for treatment, defined as the assignment to treatment which was randomly assigned within each strata (odd columns), or takeover, which is defined as having attended at least 75% of the course (even columns). The TOT regressions instrument takeover with treatment. Dependent variable in the first two columns is the time taken by the DM's "production team" to complete the task. Dependent variable in columns 3 and 4 is the number of mistakes made by the DM's "production team" compared to the instructions. Columns 5 and 6 are the time in minutes spent by the DM talking with the "FM". Columns 7 and 8 are the number of questions asked by the DM to the "FM". Panel B shows the same indicators when the task was simple and instructions were given in Burmese. All the data was collected at endline, before COVID-19 made us stop these in-person activities. The regressions include strata fixed effects. standard errors are reported in brackets. They are computed using a cluster at the FM level. standard errors for the full sample we reached for the endline (N=268) but not for the in-person endline are reported in bold in square brackets. standard errors for ahypothetical sample of 900 domestic managers, corresponding to all of the DMs in the entire SEZ, are reported in curly brackets.

Table 7: Donor Pool of Characteristics and Interview Responses

Panel A: Treatment matrix for resume experiment	
Criteria	Values
Gender	{Male, Female}
Age	{25, 26}
English level x Previous company ownership	{ (Elementary, Myanmar), (Elementary, Japanese) (Advanced, Myanmar), (Advanced, Japanese) }
Previous company size	{25 employees, 125 employees}
Work experience	{1 year, 3 years}
Panel B: Treatment matrix for mechanisms	
Criteria	Values
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}
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}

Notes: Table reports the donor pool of values for each demographic characteristic. The second panel reports the donor pool of values for each response to the "interview" questions.

Table 8: Characteristics Valued by HR Managers: Demographics

	Choose one	Wage offer	Learning	Invt 1-4	
High English, Domestic Firm	0.494 (0.056)	45.097 (5.648)	0.343 (0.078)	0.168 (0.042)	0.139 (0.039)
Low English, MNC	0.285 (0.051)	29.636 (5.740)	0.368 (0.075)	0.015 (0.039)	0.021 (0.044)
Low English, MNC	0.724 (0.063)	88.766 (8.180)	0.795 (0.090)	0.316 (0.052)	0.286 (0.058)
Age (=26)	-0.037 (0.029)	4.093 (3.042)	-0.012 (0.049)	-0.006 (0.029)	0.027 (0.031)
Gender (=Male)	0.072 (0.031)	5.033 (3.260)	0.038 (0.057)	-0.023 (0.032)	-0.021 (0.037)
Large size (=125)	0.364 (0.047)	35.585 (5.021)	0.379 (0.087)	-0.034 (0.050)	0.013 (0.054)
Experience (=3y)	0.548 (0.041)	73.749 (5.506)	1.213 (0.093)	0.529 (0.060)	0.525 (0.069)
Rater FEs	Yes	Yes	Yes	Yes	Yes
Pair FEs	Yes	Yes	Yes	Yes	Yes
N	3080	3080	3080	2480	2477
r ²	0.41	0.81	0.75	0.67	0.69

Notes: This table regresses different measures of hiring interests on the profile characteristics. Column 1 regresses a dummy of if the profile is chosen among the two shown. Column 2 reports the wage offer to each profile. Column 3 reports the respondent's rating of how much the profile would have learned at the previous job. Column 4 reports the respondent's rating of how involved the profile was in management decisions at the previous job. All regressions include respondent and profile pair fixed effects. Standard errors are reported in brackets.

Table 9: Characteristics Valued by HR Managers: “Interview Responses”

	Choose one	Wage offer	Learning
Frequent communication with FM	0.511 (0.042)	40.423 (3.967)	0.529 (0.061)
Selected to communicate frequently	0.069 (0.062)	4.573 (4.526)	0.105 (0.060)
Frequent Microsoft user	0.409 (0.039)	31.872 (3.372)	0.427 (0.047)
Frequently setting targets	0.785 (0.045)	56.729 (5.549)	0.898 (0.082)
Rater FE	Yes	Yes	Yes
Pair FE	Yes	Yes	Yes
N	1694	1694	1694
r ²	0.50	0.92	0.87

This table regresses different measures of hiring interests on the interview characteristics. Dependent variable in the first column is whether the resume was chosen out of the two displayed to the respondent. Dependent variable in the second column is the wage offer stated by the respondent for the profile. Dependent variable in the third column is an evaluation made by the respondent of how much the candidate has learned on the job, on a scale from 1 to 10. The regressions include fixed effects for respondents and pairs of interview scripts. standard errors are reported in brackets.

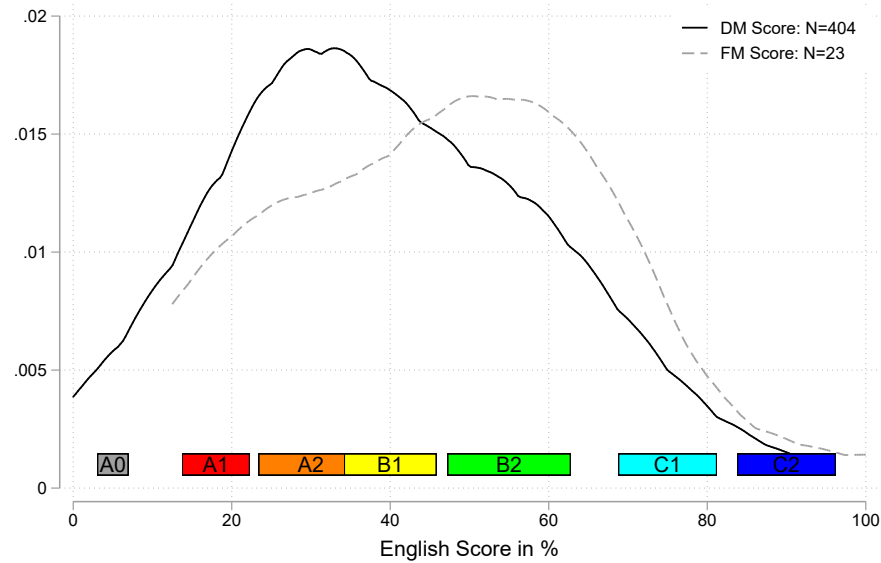
Table 10: DMs' Willingness-to-Pay for FM time

	WTP FM		WTP FM out. firm		WTP DM	
	(1)	(2)	(3)	(4)	(5)	(6)
	ITT	TOT	ITT	TOT	ITT	TOT
Treatment	32.7	68.8	19.1	40.5	7.7	16.4
	(14.297)	(30.195)	(8.130)	(16.816)	(6.699)	(13.603)
	{6.639}		{4.612}		{3.584}	
Baseline value	No	No	No	No	No	No
Strata FEs	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	32.23	49.28	26.89	36.28	24.04	26.99
1st st. F-stat		94.24		123.73		77.63
N	212	212	269	269	220	220
R2	0.16	0.05	0.15	0.08	0.13	0.11

Notes: Table regresses Willingness to Pay (WTP) for a one hour, one-on-one conversation with different managers on indicators for treatment, defined as the assignment to treatment which was randomly assigned within each strata (odd columns), or takeup, which is defined as having attended at least 75

Figures

Figure 1: English level is low



Notes: Figure displays the kernel density of the English scores obtained by DMs and FMs, respectively. The scores were collected during in-person baseline surveys that took place mostly during the first semester of 2018 and a bit during the first few months of 2019. The scores are the means of a listening scores and a speaking score. The listening scores were computed based on Multiple Choice Questions about audio recordings in English designed by the research team and the speaking scores were given by blind external graders (we took the average of the two scores given). The horizontal tickers represent the correspondence of the scores with the CEFR language levels, based on the placement decision our language provider Edulink made for individuals with these scores.

A. Appendix Tables and Figures

Table A.1: Human Resource Manager Summary Statistics

	Mean	Sd	N
Age	29.8	(6.8)	76
Education (years)	16.3	(0.8)	73
Work experience (years)	7.4	(5.6)	77
Experience in FDI (years)	2.7	(3.7)	77
Current company size (empl.)	893.0	(2066.5)	77
Resumes seen in the last 6 months	485.0	(861.7)	77
People recruited in the last 6 months	60.8	(171.9)	77
Recruited people with FDI exp.	25.4	(115.4)	77
Currently in FDI firm	0.3	(0.5)	77

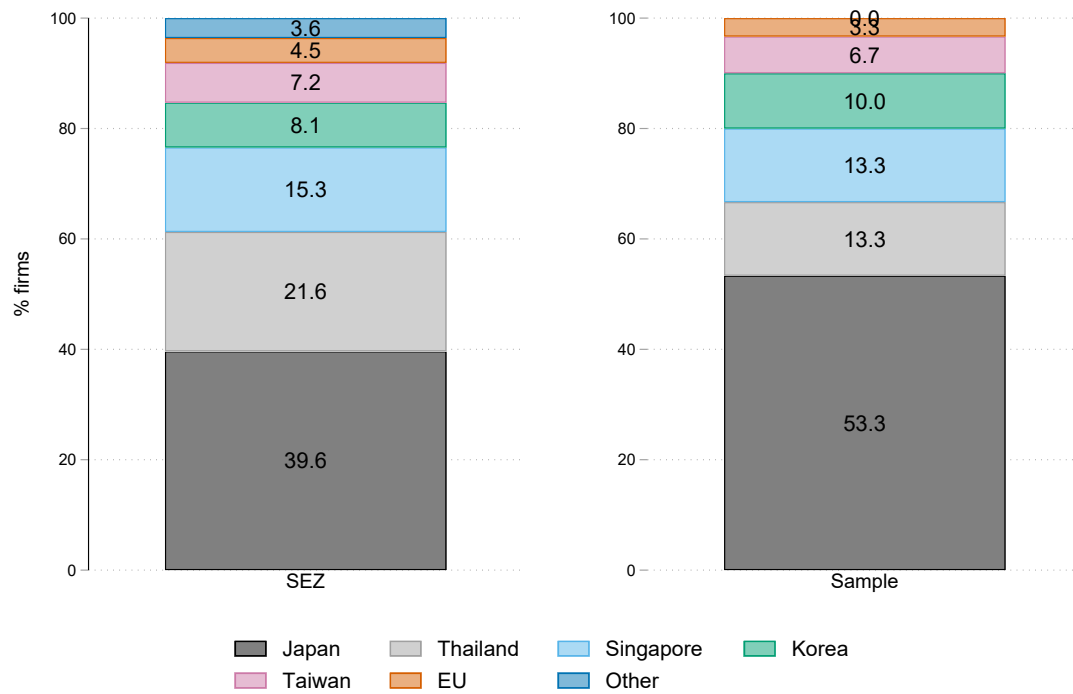
Notes: Table reports the mean, SD and number of observations for different variables. The first panel reports these statistics for variables related to firms in the resume experiment sample. The second panel reports these statistics for variables related to HR managers in the resume experiment sample. The data were collected through an online survey at the beginning of the resume experiment.

Table A.2: Promotion, Wages and Job Search

	Promotion		Log wage		Job applications	
	(1)	(2)	(3)	(4)	(5)	(6)
	ITT	TOT	ITT	TOT	ITT	TOT
Treatment	0.022	0.044	-0.008	-0.017	0.292	0.604
	[0.681]	[0.660]	[0.908]	[0.901]	[0.108]	[0.082]
	{0.433}		{0.469}		{0.045}	
Baseline value	No	No	No	No	No	No
Strata FEs	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	0.56	0.57	5.89	5.88	0.49	0.55
1st st. F-stat		130.85		108.03		129.08
N	269	269	235	235	266	266
R2	0.20	0.20	0.23	0.23	0.16	0.15

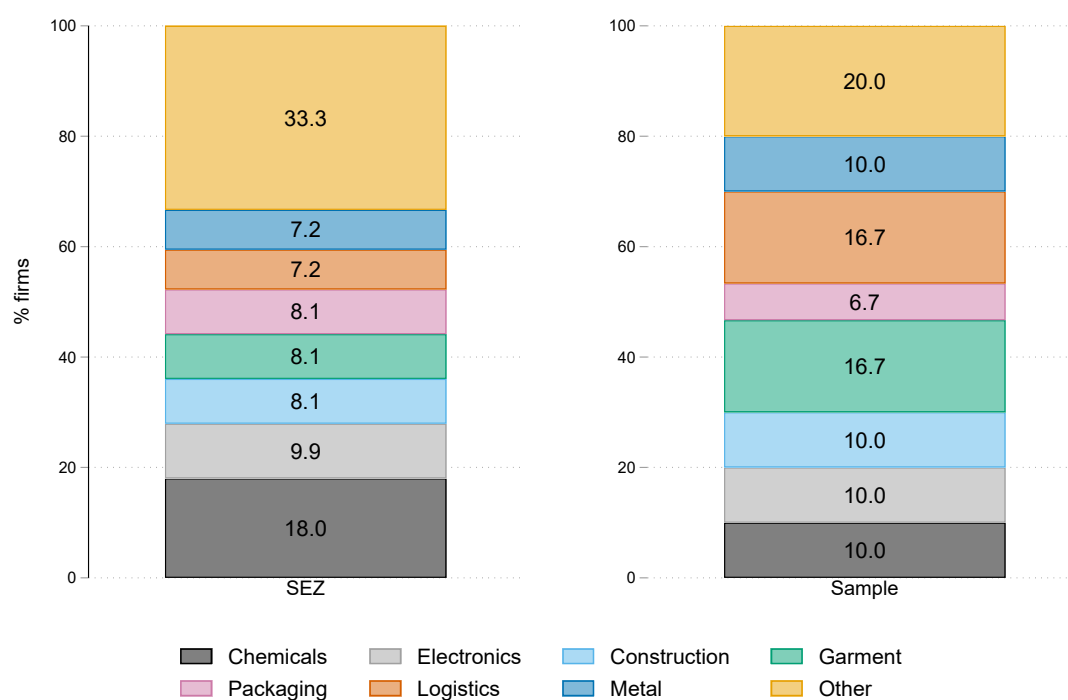
Notes: Table regresses different professional outcomes on indicators for treatment, defined as the assignment to treatment which was randomly assigned within each strata (odd columns), or takeup, which is defined as having attended at least 75% of the course (even columns). The TOT regressions instrument takeup with treatment. Dependent variable in the first two columns is an indicator for whether the respondent has received a promotion. Dependent variable in columns (3) and (4) is the log wage. Dependent variable in the last two columns is the number of job applications reported by the respondent. The data were collected at endline which took place in person (before COVID-19) and then over the phone. The regressions control for the mode of endline, include strata fixed effects and the baseline value of log wage for columns (3) and (4). standard errors are reported in brackets. They are computed using a cluster at the FM level.

Figure A.2: SEZ Firms by Country of origin



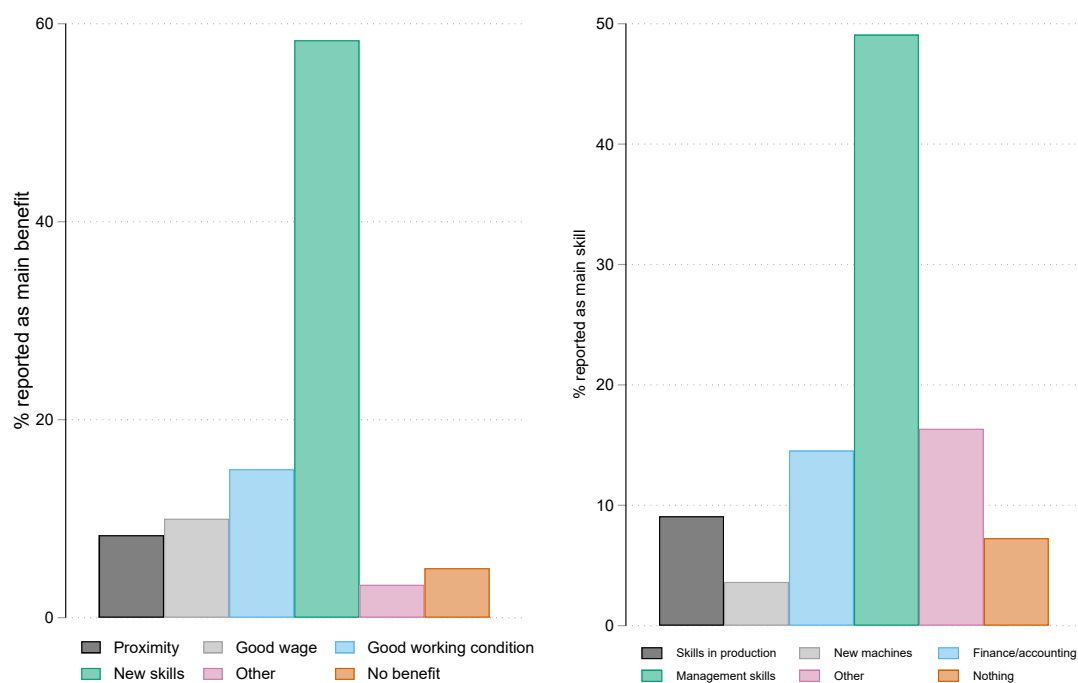
Notes: The left-hand side figure displays the share of SEZ firms whose main investor is from each country. The right-hand side figure shows the share of firms in our sample whose main investor is from each country. The data are publicly available on the SEZ website.

Figure A.3: SEZ Firms by Sector



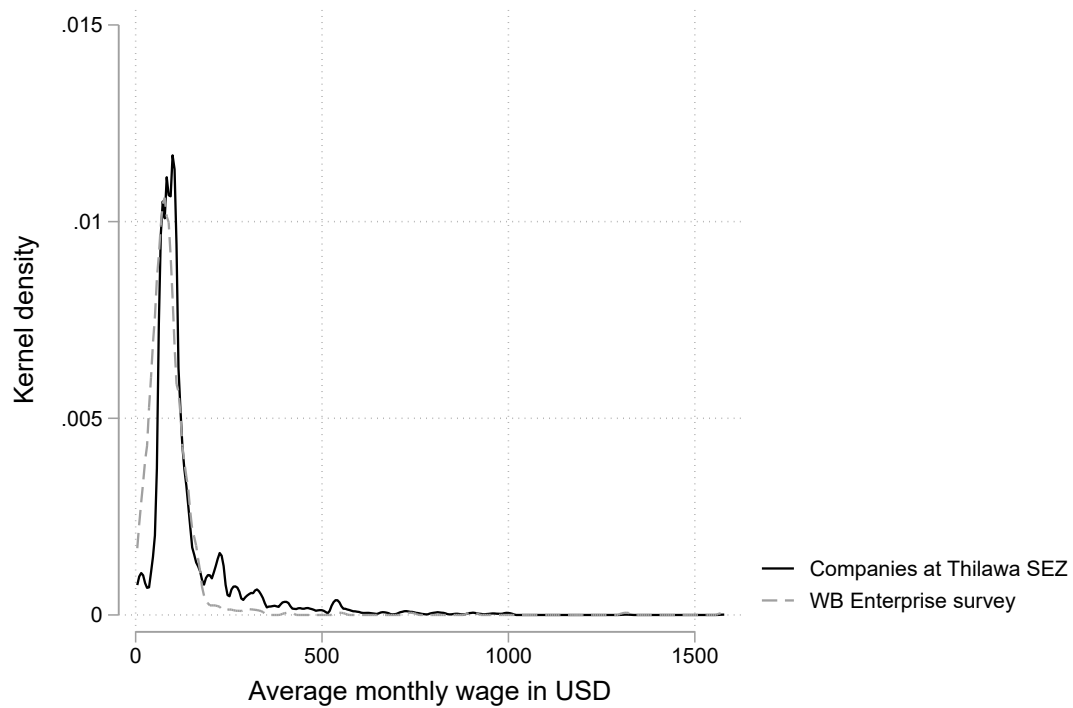
Notes: The left-hand side figure displays the share of SEZ firms operating in each sector. The right-hand side figure shows the share of firms in our sample operating in each sector. The data are publicly available on the SEZ website.

Figure A.4: Main benefits and skills acquired by employees at the SEZ



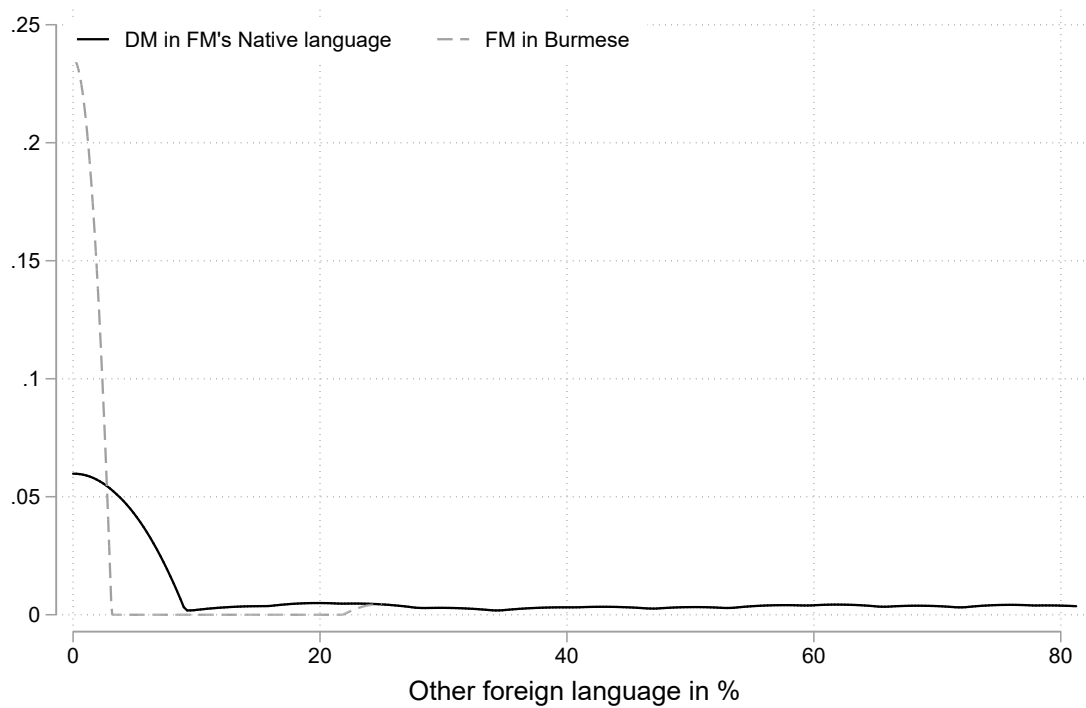
Notes: Figure displays the share of DMs who reported the particular benefit as their primary benefit of working at the zone (on the left side) and the share of DMs that reported the particular skill as their primary skill they were hoping to acquire at the zone (on the right side). These answers were collected through paper questionnaires distributed in 2017.

Figure A.5: Wage distribution inside and outside the SEZ



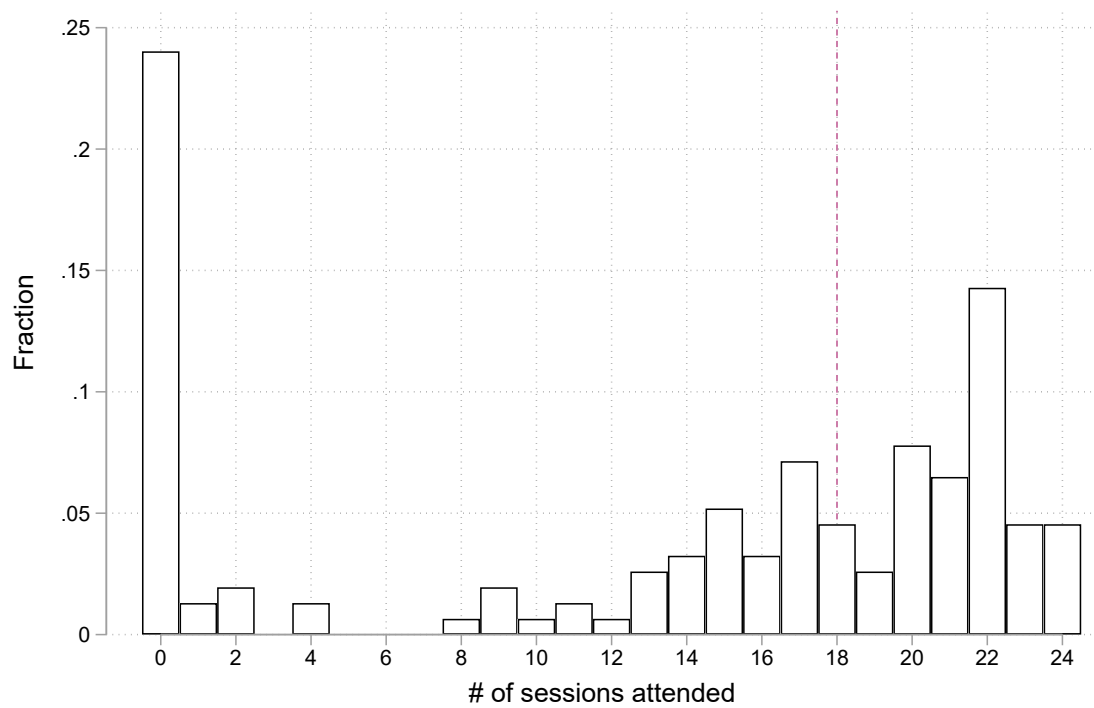
Notes: The figure displays the distribution of monthly wage in USD of employees of companies located at Thilawa SEZ compared to employees of companies surveyed by the World Bank Enterprise survey, which aims to be representative of Myanmar firms. The data for Thilawa SEZ companies was collected through a paper-based survey distributed to all employees in 2017.

Figure A.6: Other language ability in DM Sample



Notes: Figure displays the distribution of DM test scores on the native language of FMs at their company, and the distribution of FM test scores in Burmese.

Figure A.7: Attendance of the treatment by individuals assigned to treatment



Notes: The figure represents the distribution of attendance of study participants who were assigned to treatment. The unit is the number of sessions (two hours). The red line represents the relevant threshold of participation for what we defined as "takeup" 75% or 18 sessions.