LANGUAGE BARRIERS IN MULTINATIONALS AND KNOWLEDGE TRANSFERS

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ABSTRACT

A distinct feature of MNCs is a three-tier organizational structure: foreign managers (FMs) supervise domestic managers (DMs) who supervise production workers. Language barriers between FMs and DMs could impede transfers of management knowledge. We develop a model in which DMs learn general management by communicating with FMs, but communication effort is non-contractible. These conditions generate sub-optimal communication within the MNC. If communication is complementary with language skills, the planner could raise welfare by subsidizing foreign language acquisition. We experimentally assess the validity of the general skills and the complementarity assumptions in Myanmar, a setting where FMs and DMs communicate in English. The first experiment examines the general skills assumption by asking prospective employers at domestic firms to rate hypothetical job candidates. They value candidates with both higher English proficiency and MNC experience, a premium driven, in part, by frequent interactions with FMs. The second experiment examines the complementarity assumption by providing English training to a random sample of DMs working at MNCs. At endline, treated DMs have higher English proficiency, communicate more frequently with their FMs, are more involved in firm management, and perform better in simulated management tasks. Organizational barriers within MNCs can thus hinder knowledge transfers.

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1   Introduction

Developing countries routinely offer subsidies to attract multinational companies (MNCs) with the hope of generating positive spillovers for the rest of the economy. While some studies detect evidence of the latter, others do not (see Harrison and Rodriguez-Clare 2010 for a review). The uneven empirical support suggests that beneficial spillovers are not automatic, contextual factors may matter, and that policymakers might have to consider complementary policies to fully realize potential spillovers from MNCs. A transfer of knowledge from MNCs to domestic firms and workers is the initial *spark* for spillovers. This paper documents that language barriers within MNCs can be an important friction limiting this initial knowledge transfer—and thus the potential for spillovers—and examines under which conditions a government intervention is justified.

A distinct feature of MNC organizational structures is that a subsidiary is typically led by experienced foreign managers (FMs) who supervise less-experienced domestic middle managers (DMs), who in turn supervise domestic production workers. In these firms, communication between an FM and a DM often occurs in a language that is not native to at least one layer. In our setting–MNCs operating in Myanmar–communication occurs in English, a non-native language for both layers. Tailored surveys reveal that DMs' English proficiency is low on average and that language barriers are an impediment to learning from FMs. Language acquisition and communication, however, are costly activities, and a certain level of language barriers would be expected within a MNC, even when firms and employees invest in the privately optimal level of language training.

In this paper, we ask under what conditions private incentives to invest in English knowledge diverge from the social optimum and examine whether these conditions arise in our context. We first formulate a model in which a DM learns management–a skill that is tacit and hard-to-codify (Polanyi 1966, Gibbons and Henderson 2012)–by communicating with an FM. Following a standard assumption within organizational economics, we assume that the amount, and content, of communication between the FM and DM is non-contractible (e.g., Crawford and Sobel 1982, Dessein 2002 and, for an approach closer to our model, Dewatripont and Tirole 2005). This "within MNCs" contractual friction, which we take to be a realistic feature of the workplace, leads to under-supply of communication between organizational layers when the knowledge acquired through communication with the FM is a *general skill*. In those circumstances, the planner would like to intervene to reduce communication frictions between FMs and DMs to boost knowledge transfers. The non-contractibility of communication within organizations, however, prevents the planner from targeting directly the market failure. Instead, we consider one practical policy instrument to bring the decentralized equilibrium closer to the socially efficient level of communication: subsidizing language acquisition. A necessary condition for the planner to be able to partially correct the inefficiency by subsidizing English acquisition is that communication is *complementary* with language ability.[1]

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[1] We take it for granted that a common language improves efficiency as shown in, for instance, Cremer et al. 2007's model of optimal language design ("code") inside an organization and lab experiments (e.g., Selten and Warglien 2007). To focus on how non-contractible communication within an MNC hinders the initial transfer of knowledge, we deliberately abstract from productivity spillovers to workers and other firms. For the same reason, we also abstract from imperfections in the market for language training as a general skill (e.g., Acemoglu and Pischke 1998).

We explore the validity of the *general skills* and *complementarity* assumptions through two experiments. The first protocol examines whether the management knowledge learned through communication at MNCs is a general skill valued by domestic employers.[2] We recruit a sample of 51 experienced human-resource managers who work at domestic firms to rate hypothetical resumes of job applicants for a general management position. In a first block of questions, HR managers are shown pairs of resumes that vary randomly in applicant characteristics. HR managers place a premium on applicants with English knowledge, MNC experience, and particularly value applicants with both characteristics. We explore the mechanisms driving this premium through a second rating exercise. In this second block, HR managers rate applicants with advanced English proficiency and MNC work experience according to their hypothetical answers to interview questions. We randomly vary how frequently the applicant reports interacting with their FM, how involved they are in management, and how frequently they use Microsoft Office (a hard skill). Applicants with frequent interactions with FMs are offered wages as high as those offered to applicants with the hard skill.[3] These findings support the assumption that frequent communication with FMs allows DMs to learn general management knowledge that is valued by the domestic labor market.

The second experiment explores the complementarity between communication and English proficiency. We contracted with a leading English language training provider in Yangon to offer a free 48-hour English training course to a random sample of DMs employed at 27 MNCs operating at Myanmar's largest Special Economic Zone. At endline, treated DMs' English skills, as measured by a tailored test, improve relative to control. Several results support the complementarity assumption: treated DMs report having more frequent communication and interactions with FMs (but not with other DMs), having a higher (hypothetical) willingness to pay for additional time interacting with FMs (but not with other DMs), and being more involved in the management of personnel.

Tracking how the intervention altered on-the-job performance and knowledge transfers is complicated for two reasons. First, DMs perform a wide range of tasks at the MNCs, and thus it is difficult to consistently measure performance across DMs. To overcome this measurement challenge, we design a standardized management exercise that simulates the organizational structure of an MNC. An English-speaking enumerator acting as a "FM" provides instructions to a DM to manage a packaging task. The task is a randomly drawn vector of steps that place specific items in a precise order and packaged in a certain way. The DM then manages two enumerators (who have no English knowledge) acting as production workers ("PWs") to complete the task. The "PWs" supervised by treatment DMs complete their assigned task faster with no differences in mistakes—i.e., achieve higher performance—relative to control DMs. Treatment DMs, however, ask more questions and

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[2]An alternative approach to measure generalizable skills is to measure general knowledge transfers through a test but this is challenging to implement since the DMs perform a wide range of tasks. Below, we discuss a survey that attempted to record skills to complement this first protocol.

[3]A potential concern is that HR managers in domestic firms might perceive these candidates to be better selected, rather than having directly benefited from frequent communication with FMs in their previous jobs. A third response option regarding frequency of communication, which explains that the applicant was supposed to interact frequently with the FM, but did not for exogenous reasons, allows us to test for this possibility. We find no evidence for a potential selection effect.

spend more time communicating with the "FM". This supports the complementary assumption. The second complication is that the actual management knowledge transfers learned from interacting with FMs would take time to materialize.[4] To overcome this challenge, we conducted a follow-up survey to track skills more than a year after the language intervention. This survey was, unfortunately, initially complicated by the pandemic and then subsequently by the February 2021 military coup. Notwithstanding these shocks, the survey provides us with some evidence that the intervention raised certain general soft skills among treatment DMs, thereby complementing the results from the aforementioned resume rating protocol.

The final section explores additional survey evidence and back-of-envelope calculations that supports a key assumption of the model–the non-contractible nature of communication–and the additional conditions justifying the use of language subsidies as a policy instrument. These additional conditions appear to be relevant in our context, thus justifying an intervention. It is worth emphasizing, however, that the particular language training we offered is unlikely to be the most cost effective intervention to raise English proficiency since foreign languages are more effectively learned at a younger age (Dixon et al. 2012) and there might be additional imperfections in the market for language training.

Our project explores the conditions for policy intervention in Myanmar, but we believe that such conditions arise in other contexts. The adoption of English as the corporate lingua franca is increasingly common (Economist 2014), particularly outside Anglophone countries. Additionally, recent decades have seen a sharp rise in South-South FDI flows, e.g., the surge of Chinese investments in Africa (Hanson 2012). Language barriers could be an important impediment to knowledge transfers in these contexts. In contrast, when 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 may be a smaller barrier and the rationale for policymakers to intervene diminishes (as predicted by our model). A large literature indeed documents that common language is an important driver of trade and FDI.[5] We provide a first attempt to explore how a particularly salient dimension of culture—language—mediates the impact of FDI in a field setting, and, in doing so, provide a concrete example of how cultural contextual factors can shape the success or failures of development policies (Nunn 2019).

Our main contribution is to emphasize how language barriers can exacerbate organizational frictions within MNCs and impede the initial source of knowledge transfers necessary for spillovers from FDI. Besides the aforementioned literature on language and FDI, we thus connect two separate but related strands of the literature. Multinationals are a key source of technology and knowledge and drive a large share of world trade (e.g., Keller 2004, Keller and Yeaple 2013, Yeaple 2013). For this reason, a large literature seeks to understand the consequences of FDI on developing countries;

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[4]As with the measurement of on-the-job performance, a further complication is that the wide range of DMs' tasks implies that the skills they potentially learn from interacting with FMs are hard to list ex-ante and difficult to measure (e.g., through a standardized test) ex-post.

[5]For empirical evidence of language barriers and trade flows, see, e.g., Rauch and Trindade (2002), Head et al. (2010), Melitz and Toubal (2014), and Morales et al. (2019). For FDI flows, see, e.g., Burchardi et al. (2019).

see the comprehensive survey by Harrison and Rodriguez-Clare (2010) and the recent review by Keller (2021). These studies typically focus on spillovers from MNCs to domestic firms and workers, for example through supply-chain linkages (e.g., Aitken and Harrison 1999, Javorcik 2004, Abebe et al. 2018) or through wages (e.g., Poole 2013). Systematic evidence for positive FDI spillovers has proven elusive. One possibility, overcome by Alfaro-Ureña et al. (2019), is that measurement and identification challenges make spillovers difficult to detect. A second possibility is that contextual factors, like those explored in this paper, might influence the likelihood that FDI generate positive spillovers for the host economy.

A separate literature has analyzed the internal organizational structures of MNCs; see the survey by Antràs and Rossi-Hansberg (2009). 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). Antràs et al. (2008) argue that MNCs create a layer of middle managers in host countries to reduce the costs of transmitting knowledge across borders. Unlike this literature, which builds on Garicano (2000) model's of hierarchies, we focus on the inefficiency arising from the non-contractibility of communication.[6] Relatedly, Keller and Yeaple (2013) also argue that because knowledge embedded within MNCs is difficult to codify, offshore production requires communication between headquarters and foreign affiliates. The efficiency losses from language barriers could also rationalize the cross-border MNC technological frictions often calibrated in quantitative models (e.g., Arkolakis et al. 2018).[7]

Our paper also contributes to the literature on management practices (e.g., Bloom and Van Reenen 2007, Bloom et al. 2012b). Two findings from this literature motivate our work. First, firm performance correlates with the quality of management practices and multinational firms are better managed (Bloom and Van Reenen 2007, Bloom et al. 2016). Second, management practices diffuse slowly because they are hard to codify and transmit (Gibbons and Henderson 2012). Rather than offering explicit management consulting or training interventions (e.g., Bloom et al. 2012a, Macchiavello et al. 2015, Alfonsi et al. 2020), our paper argues that management can be learned from direct interactions *within* an organization. Recent studies have also studied management knowledge transfers *between* firms. Cai and Szeidl (2017) find large impacts of business networks on firm performance in China; Giorcelli (2019) find large impacts on Italian firms that sent managers to the U.S. for management training; Bai et al. (2021) examine the role of supplier networks and labor mobility in fostering knowledge spillovers in the Chinese auto-industry; Bisztray et al. (2018) document knowledge spillovers in importing along managerial networks.

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[6]Contracting problems and informational barriers have been shown to be important constraints to trade (e.g., Macchiavello and Morjaria 2015, Bai et al. 2020, Chen and Wu 2021, Startz 2021) and arguably could also inhibit knowledge transfers, particularly in low income countries (see Atkin and Khandelwal 2020 for a review). We focus on within-firm interactions and highlight the role of non-contractible communication and language barriers in limiting transfers of management knowledge. Atkin et al. (2017) show that technology adoption can be slowed by communication frictions within the firm (but due to incentive problems, not language barriers).

[7]The management literature has also examined language barriers within MNCs (see the recent survey by Tenzer et al. 2017). One line of study is the choice of the company's lingua franca exemplified in the cases of Japanese companies adopting English: Rakuten (Neeley, 2017) or more recently, Honda. Our project, instead, takes the language of communication as given and studies the problem from the policymaker's perspective.

The paper is structured as follows. Section 2 describes the setting and facts that motivate the model and experiments. Section 3 describes the model. Section 4 describes the resume experiment that tests the "general skills" assumption in the model. Section 5 describes the language experiment that tests for the "complementarity" assumption in the model. Section 6 discusses other model's assumptions and the rationale for policy intervention. Section 7 concludes.

2 Setting & Motivating Evidence

This section describes our setting and the evidence that motivates the research design.

2.1 Setting

Following a military coup in 1962, Myanmar spent nearly five 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 and 2019 was $2.5 billion compared to just $0.4 billion in the previous decade. Roughly 90% of flows originate from East and South-East Asia.[8]

The 2014 Special Economic Zone (SEZ) Law was a key component of the economic reforms and it established the regulatory framework that governs the country's SEZs. Much of our analysis focuses on firms operating in the country's main zone, Thilawa SEZ, which opened in September 2015. Firms at Thilawa receive the typical 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). In 2018, there were 45 MNCs with operations at the SEZ. Japanese MNCs are the largest investors, followed by Singaporean, Thai, Chinese, European/American and Korean MNCs. The MNCs span a wide range of sectors, including chemicals, distribution, electronics, garments, logistics, machinery, and metals (see Figure A.1).

2.2 Timeline

Our data come from tailored worker and firm surveys conducted between Summer 2018 and Summer 2020.[9] In 2018, we conducted a survey of 400 domestic managers (DMs) at 30 MNCs.[10] A consistent definition of a "manager" is not straightforward because the firms span many sectors and managers span many tasks (e.g., production supervisors, human-resource managers, purchasing agents, and so forth). Piloting revealed that individuals earning over $200/month, the income-tax reporting threshold in Myanmar, is a plausible objective metric to identify DMs at each company.

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[8]Calculations from World Development Indicators, WB Open Data and Myanmar's Directorate of Investment and Company Administration.

[9]We supplement these surveys with administrative data collected by the SEZ, when available.

[10]The 30 firms who agreed to participate had on average 141.4 employees. The 15 firms who did not participate were smaller, with on average 60.1 employees.

This survey assessed language proficiency in English and in the original foreign language of the company, and asked about DMs' communication and interactions with FMs. We simultaneously conducted a firm-level survey by asking the HR managers questions about FMs' language skills and learning frictions at the company.

In January 2019, we designed the language experiment protocol and recruited 27 MNCs to participate.[11] We surveyed 298 DMs at these firms by phone to collect baseline outcomes and their scheduling preferences for the language training. When we refer to the "baseline survey", we refer to both the 2018 in-person survey and the phone survey from January 2019. We then periodically surveyed participants by phone throughout the duration of the treatment and beyond. In January 2020, we started administering the endline survey, testing participants on language and asking about communication within the firm.[12] The in-person endline was interrupted in March 2020 due to Covid-19 and, given necessary precautions, the survey resumed remotely. The endline was completed in June 2020. In June 2020, we recruited human-resource managers at domestic firms outside the SEZ to conduct remotely the resume rating exercise. Finally, in January 2021, we began a survey to measure potential skills among the DMs. As discussed below, this survey was implemented remotely due to the ongoing pandemic, subsequently paused in February 2021 because of the military coup, and completed remotely in October 2021. We explain more details about the surveys and experiments in Sections 4 and 5.

2.3 Motivating Facts

The data collected in 2018 reveal five facts about MNC organizational structures, language barriers, communication and learning that motivate the model and empirical strategy. We describe these facts here.

Fact 1: Three-Layer Organizational Structure

Table 1 reports the organizational structure of the firms. The top layer is comprised of a small number, 4.5 on average, 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. These FMs are, on average, 39.3 years old and have 8.8 years of work experience at their firm. Their average salary is $2002 per month with a standard deviation of $2100. The typical FMs works in Myanmar for 2.2 years.

The second layer is comprised of an average of 13.3 Myanmar middle-managers (DMs). The DMs are younger than FMs, on average 28.5 years old, and earn an average monthly salary of $363. The third layer is comprised of Myanmar domestic production workers, who earn $99 per month on

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[11]Of the three firms who did not participate, one is a large Chinese MNC who uses Mandarin as their lingua franca and would not have valued the English training, and the other two Japanese firms had an average employee size of 94.5.

[12]Throughout the project, we attempted to survey FMs with limited success. We did conduct interviews and language tests for 23 FMs. Anticipating a low response rate, we use summary statistics from the survey of FMs as motivating facts, and designed the project to not require their active participation.

average. For reference, Myanmar's GDP per capita is roughly $117 per month and the minimum monthly wage is approximately $70.

Fact 2: DMs Want to Learn Management Skills

The DMs in our sample perform a range of tasks that would be familiar to middle managers in other settings. For example, interviews reveal that the DMs are responsible for monitoring and evaluating employees, handling order logistics for customers or suppliers, preparing sales reports and invoices, and settling financial accounts. Most of them (two thirds) manage several subordinates, while the rest of them focus on more technical tasks such as accounting or finance. In any case, interactions appear to be an important component of their job profiles. On a typical day, a DM reports spending 33.3% of the workday in meetings, which is similar to the 27% of time that that employees in North America, Europe and the Middle East spend in meetings in a typical day according to DeFilippis et al. (2020).

Pilot surveys elicited why DMs chose to work at MNCs. Panel A of Figure A.2 shows that nearly 58% of DMs report that learning new skills is the main benefit of working for the MNCs in the SEZ. In contrast, higher wages and better working conditions are reported to be the main benefit of working in the SEZ by only 10% and 15%, respectively. Panel B reveals that it is specifically management skills that most DMs intend to learn at their jobs (more so than hard skills, like production skills or accounting). Pilot interviews suggested that interactions with FMs were important for building management skills.

Fact 3: DMs English Language Proficiency is Low

Communication between FMs and DMs occurs in English, which is the native language of neither group.[13] Despite being more educated than production workers and probably better selected, in part, to communicate with FMs relative to DMs in Myanmar firms, English knowledge among DMs in our sample is low.

We assessed language proficiency through two tests. One test was conducted by the firm we hired for the language training and administered to a random sample of DMs (see Section 5 for details). Assessing language proficiency being the core business of the provider, we present these results first to establish the baseline level of English proficiency in the sample of DMs. Panel A of Figure 1 presents the distribution of scores and their mapping to the Common European Framework of Reference for Languages (CEFR) scale according to the language provider. The test scores indicate that 85.4% of sampled DMs have, at best, an elementary level of English proficiency which includes less than A1, A1 or A2 levels on the CEFR scale. A person with A1 proficiency can "understand and use only a few everyday expressions/phrases aimed at the satisfaction of needs of a concrete type." A person with A2 proficiency can "understand sentences and frequently used

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[13]English knowledge in Myanmar is low and the country ranks 93rd on the EF English Proficiency–which lies in the category of "very low" proficiency–alongside neighboring countries Cambodia and Thailand, and just below "low" proficiency countries like Bangladesh and Vietnam (EPI 2020).

expressions for areas of immediate relevance but not much beyond." Only a minority of DMs, 14.6%, have achieved the intermediate "B" categories on the scale or above.

With the help of two external consultants, we also created and administered our own language tests to the full sample of DMs and the sub-sample of FMs. In the listening module, DMs were asked to answer 16 questions, in an increasing order of difficulty, until they answered two consecutive questions incorrectly. In the speaking module, DMs answered questions in English about their work routine and career aspirations and their answers were independently scored by the two consultants. On the subset of DMs who took both the language provider's test and our test, Figure A.3 indicates a positive correlation between the two suggesting that our tailored test can assess language proficiency.

Panel B of Figure 1 reports the distribution of test scores among the DMs and FMs at baseline. This figure demonstrates that English proficiency among DMs is on average lower than FMs: the average FM score is about one sd above the average DM score. As mentioned above, we had difficulty securing time to administer the English test to all FMs. However, during the Summer 2018 survey administered to HR managers to collect firm-level data, the HR managers were asked to report the English proficiency of FMs and DMs. Those responses, denoted by a ‡ in Table 1, confirm that DMs proficiency is low: on average, just 11.1% of DMs are reported to be "proficient" in English compared to 32.3% of FMs.

We also administered tests to assess FMs' knowledge of Burmese and DMs' knowledge of the native language of the FMs (Chinese, Japanese, Korean, depending on the firm). Figure A.4 reports these distributions; virtually none of the FMs know Burmese and very few DMs are proficient in the FMs' language.[14]

Fact 4: Learning Challenges

Language barriers between FMs and DMs appear to create challenges to learning. DMs report that 33.8% of the time they spend in meetings together with FMs is lost due to language barriers. Additionally, at these meetings, DMs report a low level of comprehension, on average 60.4% of the conversation. Average comprehension rises to a modest 62.9% with Google Translate. The limited benefit likely stems from Google Translate not translating directly between Burmese and Japanese/Korea/Chinese (a challenge known as indirect translation). Average comprehension rises to 84.0% when a translator is present. Translators, however, 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 pay for translation services for, on average, 1.5 hours per day and the translator typically follows the FMs. Part-time translators cost approximately $100 a day, well above the average daily DM wage of $15.7. Meetings also last longer when a translator is present.

Several anecdotes provide texture to the workplace challenges created by language barriers:

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[14]Language barriers could be reduced by providing Burmese language training to FMs. In practice, FMs opportunity cost of time is significantly higher than DMs, and, because they reside in the host country for a limited period of time, their incentives to learn the local language are muted.

- 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."*

Fact 5: Lower Communication Frictions Correlate with More DM-FM communication

Lower communication frictions between DMs and FMs are correlated with more frequent communication with FMs and higher involvement in the management of the firm. We assess this by estimating the following specification:

$$y_i = \alpha + \beta english_i + X_i'\delta + \epsilon_i \tag{1}$$

where $english_i$ is the (standardized) English test score at baseline and X_i is a set of controls, including demographics and DM position.[15] We consider four outcomes: frequency of FM communication (scale 1-4), self-reported involvement in plant operations (scale 1-4)[16], the score on questions of management practices adapted from the U.S. Census of Management and Organizational Practices Survey (scale 1-15), and wages.

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[15]The 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.

[16]The scale for communication frequency is: 1) "never" 2) "seldom" 3) "often" 4) "very often". The scale for involvement 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".

Table 2 reports the results. A one sd increase in the English score is correlated with a 0.11 higher frequency of communication, 0.13 more involvement, a 0.23 higher management score, and a 0.16 higher wage.

Of course, the coefficient on English in equation (1) may be biased if DMs with better English are selected to interact with FMs based on unobservables. An (imperfect) solution to control for unobserved factors correlated with English is to measure DMs' communication with *two* superiors: their FM (who is either their direct boss or their closest FM at the firm) and a domestic manager. If the DM did not have a domestic superior, we asked them to report communication with another domestic manager with whom they interact with regularly. This allows us to compare interactions with each superior while controlling for a DM fixed effect through the following specification:

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

where α_i is a DM fixed effect, FM_{ib} is a dummy that takes a value of one if boss b is the foreign expat. We examine two outcomes: frequency of communication and the share of a typical conversation understood. For domestic bosses, the share of conversations understood is, naturally 100% since two individuals would be speaking in Burmese. The results of the regression are reported in columns 5-6 of Table 2. Not surprisingly, DMs report 0.75 less frequent communication (scale 1-4) and 27.7% more time lost with FMs relative to domestic bosses. However, these interactions improve with DM's English knowledge. Raising DM English test score by 1 sd is correlated with a 0.20 more frequent communications with the FM, and a 10.9 percentage points decrease in time lost. Although a correlation, these results suggest a complementarity between DMs' language ability and the frequency of communications with FMs.

3 Model

This section presents a model that illustrates how language barriers between DMs and FMs can justify a policy intervention. In our framework, a DM learns *general skills* by communicating with FMs. The source of the inefficiency is the non-contractibility of communication between the FM and the DM. In equilibrium, the communication effort supplied by the FM is inefficient because it only takes into account the returns of communication inside the MNCs and not the (additional) returns that accrue to the DM from learning. DMs therefore learn a suboptimal amount of general skills from the planner's perspective. The non-contractibility prevents the planner from directly targeting the source of knowledge transfers: communication. So, we consider a partial remedy of subsidizing the DM's acquisition of language skills. A necessary, but not sufficient, condition is that the FM's communication effort is *complementary* to the language ability of DM. The model therefore justifies why, even if a perfectly functioning language skill market exists, the planner may want to subsidize the acquisition of the foreign language to (partially) correct for the under-provision of communication inside MNCs.

To focus on the role of non-contractibility and language barriers in stifling the initial spark

for knowledge transfers, we deliberately abstract from productivity spillovers to domestic firms and workers as well as from imperfections in the market for language training (e.g., due to credit constraints, asymmetric information, social networks, or behavioral biases). While potentially relevant in our setting, the implications of these market failures have been investigated elsewhere (e.g., Acemoglu and Pischke 1998, Munshi and Rosenzweig 2006).

We first provide the model set up and describe the equilibrium. We then discuss the subsidy policy and conclude with a discussion of the main assumptions.

3.1 Setup

We consider a three-period model with a single domestic manager (DM, he) and a foreign manager (FM, she). For simplicity, there is no discounting across periods.

The DM and the FM communicate through a language foreign to the DM. We denote $\lambda \geq 0$ the foreign language ability of the DM and we assume that the DM can purchase units of λ in a perfectly functioning market. Specifically, we denote $c(\lambda) = c\lambda + \frac{\lambda^2}{2}$, the cost of acquiring foreign language skills to the DM, where c is the unit price charged by competitive language training providers and $\frac{\lambda^2}{2}$ represents the DM's effort cost of acquiring language skills. We assume that while λ is observable to the FM, she cannot write a contract with the DM on the level of language skills.

To focus on the interaction between DM and FM, we abstract from production workers and also assume that the DM produces a good sold at price $p = 1$ in both periods. Output produced by the DM is equal to his productivity level θ. Productivity depends on the DM's knowledge of management κ, and on communication with the FM χ. We assume that $\theta(\kappa, \chi)$ is increasing, strictly concave in both arguments, and jointly concave. For simplicity, we assume that $\theta(\kappa, 0) = \kappa$ and $\theta(0, \chi) = \chi$. Unlike for language ability, we assume that there is no market to acquire knowledge of management; instead, management knowledge is acquired only through communication with FM.

The DM starts period $t = 1$ with management knowledge normalized to $\kappa_1 = 0$. We assume that communication with the FM is given by $\chi = 2\sqrt{\lambda\tau}$, where $\tau \geq 0$ is the level of communication effort chosen by the FM. This functional form reflects the *complementary* assumption: the FM's communication effort is more effective as the DM's language proficiency rises. We denote $\gamma(\tau) = \gamma\tau$ the cost of communication to the FM. This communication effort is *non-contractible*. The non-contractible nature of communication is a cornerstone of organizational economics, which we model along the lines of Dewatripont and Tirole (2005). In this setting, the FM transmits knowledge through costly effort and the DM's ability to absorb the knowledge depends on his level of language proficiency λ, which is also acquired through costly effort detailed below.

Besides increasing productivity, communication with foreign managers leads to learning. In $t = 2$, the DM has acquired management knowledge through communication with the FM in the prior period. Since $\kappa_1 = 0$, we denote $\kappa = \kappa_2$, the management knowledge of the DM in period $t = 2$. We assume that $\kappa = \phi\chi = 2\phi\sqrt{\lambda\tau_1}$. The parameter ϕ captures the amount of skills learned through communication with the FM. It is thus natural to set $\phi \leq 1$ and, to avoid corner cases with no communication and no language acquisition in equilibrium, we also set $\phi > (c\gamma)/2$. This

condition that the profit generated by the knowledgeable DM is sufficiently large for him to want to acquire a non-zero level of language.

We also assume that as the DM accumulates human capital, returns to communication declines over time and eventually become lower than the marginal costs of communication. We consider that this happens already in period 2, i.e., $\frac{\partial \theta(\kappa_2, \chi)}{\partial \chi}\Big|_{\tau=0} < \gamma$. The assumption, which can be relaxed at the cost of a slightly lengthier taxonomy of cases, makes further communication with the FM in period $t = 2$ unnecessary. Finally, we assume a perfectly competitive market for experienced DMs in $t = 2$ and that the knowledge acquired by the DM is a *general skill*. The DM thus fully appropriates the returns from her learning. Since communication at $t = 2$ is zero, we denote $\tau = \tau_1$ the level of communication effort in $t = 1$.

The FM has an outside option equal to zero in both periods. The DM has an outside option that pays w_0 in both periods. We assume that w_0 is independent of language λ. We discuss in Section 3.4 below the role of this assumption and how it can be altered without changing the qualitative insights of the model. We also assume that the DM's wage in the multinational cannot be negative, $w \geq 0$, and that $w_0 < \phi\frac{\lambda}{\gamma}$.[17]

To summarize, the timing of events and payoffs are as follows:

- $t = 0$: DM buys language λ at unit price c and effort cost $\frac{\lambda^2}{2}$.

- $t = 1$: FM offers a wage w to DM:

    - If DM accepts the offer, FM chooses communication effort, τ, at private effort cost of $\gamma\tau$. Output is $\theta_1 = 2\sqrt{\lambda\tau}$. FM profit is $2\sqrt{\lambda\tau} - \gamma\tau - w$. DM payoff is w.

    - If DM rejects the offer, there is no output. FM payoff is zero, and DM payoff is w_0.

- $t = 2$: DM produces output, and obtains payoff equal to, $\theta_2 = 2\phi\sqrt{\lambda\tau}$. FM does not get any share of the output. If DM rejected the offer at $t=1$ there is no production at $t = 2$, and FM and DM get 0 and w_0, respectively.

3.2 Equilibrium

We describe the private equilibrium and compare it with the allocation that the planner desires.

Private Equilibrium

The model is solved by backward induction, i.e. we solve for the unique subgame perfect equilibrium. We characterize the equilibrium strategies of the DM $\{\lambda, a\}$ and the FM $\{w, \tau\}$, where $a = 1$ if the DM accepts the wage w offered by the FM and $a = 0$ otherwise.

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[17]As shown below, this assumption guarantees that the DM has some incentives to invest in language despite having no bargaining power in the wage negotiation with the FM. The assumption could be relaxed if the DM had some bargaining power, and was thus able to capture some of the returns from her investments, at the wage negotiation stage.

In $t = 2$, the DM's payoff is given by $2\phi\sqrt{\lambda\tau}$ if he has worked for the FM in $t = 1$, and w_0 otherwise. The FM's payoff is 0.

In $t = 1$, if the DM has accepted to work for her, the FM sets τ to maximize her profits: $2\sqrt{\lambda\tau} - \gamma\tau - w$. Note that the wage paid to the FM, w, does not depend on communication effort τ. This is where the non-contractibility assumption kicks in. If communication effort was contractible, DM and FM would negotiate a compensation scheme which induces the FM to also take into account DM profits at $t = 2$. To be precise, our results hinge on the fact that the FM does not internalize the *entire* returns of her communication effort in period $t = 1$ on the DM's productivity in $t = 2$. Given the non-contractible nature of communication, the FM sets

$$\tau^* = \frac{\lambda}{\gamma^2}.$$

The complementarity between communication effort and the DM's language knowledge implies that τ is increasing in language knowledge λ.

The FM payoff is thus equal to $\frac{\lambda}{\gamma} - w$ and the highest wage that she is willing to offer is $\overline{w} = \frac{\lambda}{\gamma}$. The DM accepts the wage offer w if the payoff from working for the FM and learning in period $t = 1$ and then producing in period $t = 2$, is higher than the payoff from taking the outside option in both periods, i.e., if $w + 2\phi\sqrt{\lambda\tau} > 2w_0$. The FM would like to offer a wage $w = 2w_0 - 2\phi\frac{\lambda}{\gamma}$, however the assumption $w_0 < \phi\frac{\lambda}{\gamma}$ implies that the resulting wage would be negative and thus, in equilibrium, the FM is constrained to offer a wage $w = 0$ and the DM accepts $(a = 1)$.[18]

In $t = 0$, the DM chooses λ to maximize her payoff over the two periods: $\max_\lambda \{2\phi\sqrt{\lambda\tau} - \left(c\lambda + \frac{\lambda^2}{2}\right), 0\}$ Given the assumption $\phi > (c\gamma)/2$, DM chooses

$$\lambda^* = \frac{2\phi}{\gamma} - c$$

and

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

The equilibrium strategies are then $\{\lambda^*, a = 1\}$ for the DM and $\{w = 0, \tau^*\}$ for the FM, yielding payoffs $\frac{1}{\gamma}(\frac{2\phi}{\gamma} - c)$ and $\frac{(\frac{2\phi}{\gamma} - c)^2}{2}$ for the DM and the FM, respectively.

Social Planner

The socially efficient allocation is found by setting *both* language skills λ and level of communication τ to maximize the overall surplus in the economy:

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[18]If the DM could be asked to pay the full value of learning, which generates payoff $2\phi\frac{\lambda}{\gamma}$ in $t = 2$, the FM would offer a wage $w = 2w_0 - 2\phi\frac{\lambda}{\gamma}$. The DM would then have no incentive to invest in language as her payoff would be equal to $2w_0$. The assumptions would not be needed if the DM had some bargaining power when negotiating the wage with the FM.

$$\max_{\lambda,\tau} \underbrace{2\phi\sqrt{\lambda\tau}}_{\text{output in} t=2} + \underbrace{2\sqrt{\lambda\tau}}_{\text{output in} t=1} - \underbrace{\gamma\tau}_{\text{cost of communication}} - \underbrace{\left(c\lambda + \frac{\lambda^2}{2}\right)}_{\text{cost of language aquisition}}$$

The FOCs lead to the following level of communication and language skills:

$$\lambda^{\text{SP}} = \frac{(1+\phi)^2}{\gamma} - c > \lambda^*$$

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

The social planner would thus like to choose a level of communication higher than in the private equilibrium. Because of the non-contractibility of communication, the FM chooses an inefficiently low τ for any choice of λ by the DM ($\tau^*(\lambda) < \tau^{\text{SP}}(\lambda)$ from the comparison of the first terms). If the communication effort were contractible, the DM would pay the FM to increase her communication effort in $t = 1$, which would raise communication τ to the efficient level, given λ.

DM's incentives to invest in language acquisition λ also differs from the social optimum. First, the inefficiently low τ depresses the returns to language skills for the DM. Second the DM does not internalize the output of his investment in language in $t = 1$, which is $\theta(\kappa_1, \chi) - \gamma\tau = \frac{\lambda}{\gamma}$ in the private equilibrium. Since w does not depend on λ, however, the DM underinvests in language skills, given τ.[19]

3.3 Language Subsidy

We now consider how the planner could reduce the inefficiency. The planner cannot increase communication by directly subsidizing FM's communication effort because it is non-contractible. In designing the intervention, the planner therefore needs to work with the incentive compatibility constraint of the FM given by $\tau = \frac{\lambda}{\gamma^2}$ (FM IC).

We consider a practical policy instrument where the planner subsidizes the acquisition of language skills by the DM, which would raise τ by raising λ. We denote this subsidy s so the total cost of acquiring language skills λ for the DM is now $(c-s)\lambda + \frac{\lambda^2}{2}$. This implies that the planner also faces the incentive compatibility constraint for the DM, given by $\lambda = \frac{2\phi}{\gamma} - (c-s)$ (DM IC).[20] The planner sets the subsidy s solving the following program:

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

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[19]This second source of inefficiency would however be removed if the DM had *all* the bargaining power when negotiating the wage with the FM.

[20]We assume throughout that the marginal cost of public funds (Stiglitz and Dasgupta 1971) for the planner, Ψ, is constant and equal to 1. Assuming $\Psi > 1$ would only distort the language subsidy equilibrium further away from the first best. As long as the marginal cost of public funds is not too high, $\left(\Psi < 1 + \frac{1}{2\phi - \gamma c}\right)$, it remains however optimal for the planner to subsidize the acquisition of language skills.

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

The optimal subsidy is equal to the marginal returns of λ in period $t = 1$, i.e., the portion of the social returns to language *not* taken into account by DM's investment choice. That is,

$$s^* = \left. \frac{\partial(\theta(\kappa_1, \chi) - \gamma\tau)}{\partial\lambda} \right|_{\tau=\frac{\lambda}{\gamma^2}} = \frac{1}{\gamma}$$

The equilibrium level of language skills and communication are given by

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

The language subsidy only partially corrects for the inefficiency, because it addresses the externality of the DM's language investment on FM's production, but not the non-contractibility. As a result, even though DM's language investment under the subsidy is efficient for any τ, the FM's choice of τ is still inefficiently low for any λ. So the interdependent choices of λ and τ are higher with the subsidy than under private equilibrium, but still lower than the social optimal, i.e. $\lambda^* < \lambda^s < \lambda^{SP}$ and $\tau^* < \tau^s < \tau^{SP}$.[21]

3.4 Discussion

Before moving on to the empirical analysis, we discuss further some of the assumptions we have made along the way. We discuss first our assumptions about communication within the firm. We then discuss the assumptions that justify a language subsidy as a partial remedy.

Modeling Approach

Our model is in the spirit of Dewatripont and Tirole (2005) model of communication. We capture the costly and non-contractible nature of communication, but focus, for simplicity, on the case in which only the FM exerts communication effort. Introducing a moral hazard in team framework where both the DM and the FM exert costly communication effort would not change the main insights of the model. We also implicitly assume that payoffs are non-contractible. For example, if the FM could buy a 100% equity share in the DM's firm in period $t = 2$ she would internalize the learning externality. In practice, such contracts appear implausible in our setting. Theoretically, such contracts would also not restore efficiency in more general models, e.g., if DM's effort is needed to run the firm at $t = 2$.[22]

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[21] If we assumed that the marginal cost of public fund was $\Psi > 1$, the optimal subsidy is increasing in the cost of providing language training, c, i.e. countries with higher language proficiency should subsidize less.

[22] We also assume that DMs cannot commit to work for two periods for the FM. This assumption can also be relaxed (e.g., along the lines of Acemoglu and Pischke 1998) without altering the main insights of the analysis. We also abstract from other aspects of non-contractible communication like strategic information transmission (e.g., Crawford and Sobel 1982 and Dessein 2002).

We focus on the inefficiency arising from the non-contractibility of communication. For simplicity, we abstract from the formalization of communication in hierarchies developed by Garicano (2000) (see also Antràs et al. 2008; Antràs and Rossi-Hansberg 2009; Caliendo and Rossi-Hansberg 2012 for applications to trade). In Garicano (2000), the number of layers in the hierarchy and the span of control are chosen to optimally use scarce communication resources in the organization, i.e., the organization is efficient. Changes in the cost of communication, for example due to a reduction in language barriers, could lead to changes in both the number of layers and the span of control. Testing these predictions is beyond the scope of our empirical analysis.

Conditions for a Subsidy

We have so far assumed that the wage w earned by the DM does not depend on λ. We make this assumption for simplicity, but it can be relaxed. Note that if w depends on λ, the DM IC would be given by $\lambda = \frac{2\phi}{\gamma} + w'(\lambda) - (c - s)$. The planner would like to implement $\lambda^s = \frac{(1+2\phi)}{\gamma} - c$. A subsidy s is thus justified if $w'(\lambda) < 1/\gamma$. This condition states that the marginal return to λ internalized by the DM in $t = 1$, $w'(\lambda)$, must be smaller than the marginal returns to λ for the FM, which is given by $\left.\frac{\partial(\theta(\kappa_1,\chi)-\gamma\tau)}{\partial\lambda}\right|_{\tau=\lambda/\gamma^2} = 1/\gamma$. The condition can be violated if the DM makes a take-it-or-leave it offer to the FM (in which case w captures all the surplus) or if the DM was paid a wage corresponding to an outside option $w_0(\lambda)$ with $w_0'(\lambda) \geq 1/\gamma$.[23] In Section 6, we argue that the assumptions we impose are likely met in practice.

A related scenario under which a subsidy is no longer effective is the one in which the FM and the DM can perfectly contract on the amount of language skills λ. When this is the case, they will maximize the joint surplus subject to the FM IC, thereby replicating the program of the social planner. In the equilibrium of our baseline model, if the DM can commit to work in the MNC in $t = 1$, the FM is willing to pay $1/\gamma$ for the DM to acquire an extra unit of language knowledge λ and the DM would accept the offer. In practice, this scenario is unlikely as language acquisition is a general skill and many employers might be unwilling to pay for it.[24]

Finally, note that we have imposed the standard assumption that the social planner puts equal weight on all agents. A natural extension would be to consider the case of an industrial-policy planner who only values the surplus of the FM with weight $\alpha < 1$. In our model, the FM earns rents that are increasing in τ and thus the planner might want to subsidize DM's language acquisition even in the limit case $\alpha = 0$. In practice, this limit case is not a realistic description of many industrial settings in developing countries. First, if the host government taxes (or subsidizes) some of the profits of the MNC, the planner takes into account the tax base and thus $\alpha > 0$. Second, governments fiercely compete to attract FDI. While, in theory, governments could simply rely on lump-subsidies and tax breaks to attract MNCs, the evidence suggests that policies that improves the institutional environment in which the MNCs operate are successful in attracting FDI. An

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[23]In theory, if the marginal returns to language in the outside option are *larger* than in the MNC, the DM might end up over-investing in language, thus partially compensating for the under provision of communication.

[24]In Section 6 we discuss results from an experimental protocol that suggests that FMs and DMs are unlikely to maximize joint surplus in language training attendance decisions.

industrial planner would thus commit to $\alpha > 0$. Third, if one were to model externalities from FDI, the planner would want to intervene even if $\alpha = 0$ and the DM earned no rents.

In sum, the model presented above clarifies how the non-contractible nature of communication within the firm can lead to inefficiently low knowledge transfers of general skills even in the absence of externalities or distortions in the market for foreign language training. Furthermore, if foreign language skills λ and communication effort τ are complement, the social planner may be able to partially correct the inefficiency by subsidizing foreign language skills. In Section 4, we explore the *general skills* assumption through a resume-rating experiment, where HR managers based in domestic firms evaluate the profiles of candidates with random attributes. In Section 5, we explore the *complementarity* assumption through a RCT in which we (exogenously) increase English language skills for DMs working inside MNCs. Finally, in Section 6, we discuss additional evidence on the assumptions discussed above.

4 Protocol 1: Management Knowledge as General Skills

This section investigates the empirical support for whether DMs, through communication with FMs, improve their general management skills. To do so, we measure how potential domestic employers value this skill through a hypothetical resume rating protocol. We first explain the research design and empirical specification and then discuss the results.

4.1 Research design

We assess the value of the skills learned in MNCs by eliciting the demand for such skills on the Myanmar labor market. We recruited HR managers who work at Myanmar-owned firms, operating outside the SEZ. The recruitment occurred through a job platform where we explained that we were seeking HR managers with at least 2 years of work experience to review resumes for management positions (and would be paid \$20). This recruitment exercise yielded a sample of 51 HR managers working at domestic firms. These firms are somewhat larger (median size 330) and more service-sector oriented than the firms at the SEZ (at that time). Table A.1 reports the demographics of the HR managers. As their primarily role at their companies is to recruit personnel, the typical manager reports screening 523 resumes (typically resumes submitted through online job platforms) in the past six months and hiring about 44 new employees. They have experience recruiting employees with MNC experience and themselves, on average, have 1.7 years of MNC work experience (and a total of 7.0 years of work experience).

Our hypothetical resume rating exercise is inspired by Kessler et al. (2019), who incentivize recruiters by matching them with real job seekers who have similar characteristics as the hypothetical ones chosen by the recruiters in the rating exercise. The research design yields hedonic valuations on applicant attributes. In our setting, sharing the resumes of the DMs in our sample would have jeopardized our relationship with the MNCs at the SEZ. It would have also been difficult to recruit a pool of separate DMs with the characteristics in the second block of the experiment (see be-

low). A concern with a non-incentivized resume rating exercise is whether or not the HR managers would take the exercise seriously. We address this concern when we discuss the results and their relationship to existing findings from the literature.

Block 1: Applicant Characteristics

In the first block, we created randomized resumes to analyze the valuations placed on characteristics of job applicants. The respondent was told that all potential job applicants graduated from the same university (Yangon University of Economics) with the same degree (Bachelors in Business Administration), lived in Yangon, and were married.[25] They were applying for a general management position at the respondent's company. A candidate's resume was created by randomly drawing values from the following characteristics: gender, age, English proficiency, MNC status of the previous job, previous company size, and total work experience.[26] The donor pool of characteristic values, summarized in Panel A of Table A.2, was chosen to broadly reflect the demographics of our DMs.

Each respondent was shown 20 pairs of resumes, and for each pair they were asked what wage they would offer to both candidates, how much they think both candidates would have learned at the previous job (1-10 scale), and how much involved in management they think both candidates were at the previous job (1-10 scale).[27]

We assess the HR manager responses through the following specification:

$$y_{rc} = \alpha_r + \alpha_p + \beta_1 english_c + \beta_2 MNC_c + \beta_3 english_c * MNC_c + \sum_{k \geq 4} \beta_k x_{kc} + \epsilon_{rc} \quad (3)$$

where y_{rc} is the outcome that HR manager r places on applicant c (e.g., the wage offer). The coefficients of interest are on the advanced English dummy, the MNC work experience dummy and their interaction. The interaction captures by how much more the HR manager values an applicant who is proficient in English and has MNC work experience. The x_{kc} capture the additional characteristics that we randomly vary: gender, age, previous company size and total experience. We include respondent fixed effects α_r and pair fixed effects α_p, and cluster standard errors by respondent r.

Block 2: Mechanisms

In the second block, we asked respondents to evaluate candidates' responses to potential interview questions. This block was designed to mimic questions that could arise during an interview,

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[25]Piloting revealed that job applicants in Myanmar indicate marital status and residency location on their resumes.

[26]We 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.

[27]This question on involvement separated involvement in the management of personnel and the involvement in communicating targets to subordinates. We report the average the involvement score over both dimension (the results on each individual component are similar).

and helps analyze directly the importance of communication between the applicant and his previous foreign boss.

All applicants graduated from the same university with the same degree (Bachelors in Business Administration from Yangon University), lived in Yangon, married, male, age 26, and had 3 years of experience at a 125-employee Japanese company. Additionally, the HR managers were told that the applicants had advanced English proficiency, as did their FM. The reason to note the English levels of both the applicant and the FMs was to ensure that the HR manager would perceive little, if any, communication barriers between the applicant and his FM.

The HR managers were shown profiles with answers to the following questions: a) "How often did you interact with your foreign boss (formal/informal meetings, over lunch, etc.)"; b) "How frequently did you use Microsoft Office (Word, Excel, PowerPoint); and c) "How often were you involved in setting and communicating the company's targets". The donor pool of responses to these questions are summarized in Panel B of Table A.2.

The first question elicits the valuation recruiters place on the mechanism of interest: 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 may think that the applicant had been *selected* to interact with FM based on unobserved attributes, thus conflating the treatment effect of communication with a selection effect. The last value indicates the applicant was chosen to communicate frequently with the FM but ultimately did not for exogenous reasons.[28] The second question assessed the frequency of using Microsoft Office, a hard skill that companies value. The third question assessed the frequency of management involvement in setting and communicating factory-level targets.

HR managers were shown 11 pairs of profiles with answers to these questions, and were asked what wage would they offer to both candidates, and how much they think both candidates would have learned at the previous job (1-10 scale). We did not ask to score involvement since the third interview question is about management involvement.

We assess the HR managers' responses in this block through the following specification:

$$y_{rc} = \alpha_r + \alpha_p + \gamma_1 freqcomm_c + \gamma_2 hardskill_c + \gamma_3 involvement_c + \epsilon_{rc} \qquad (4)$$

where y_{rc} is the outcome that HR manager r places on applicant c (e.g., the wage offer). All three coefficients are of interest. The categorical variable $freqcomm_c$ takes on three values, as noted above. The other variables are binary indicators. We include both respondent fixed effects α_r and

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[28]We were concerned that respondents would find this statement unusual. After the resume rating exercise was completed, we asked HR managers the following question: "In some interview scripts, you may have seen the response "I was supposed to interact frequently, but interacted infrequently because the foreign boss left the country for a family emergency." How did you interpret this?" We provided multiple choices for the HR manager to select: a) "The candidate was making an excuse for infrequent communication"; b) "The candidate may have been good if he was hired to talk frequently, but was genuinely unable to communicate with the foreign boss due to unexpected circumstances"; c) "It did not make sense"; d) "Other (please specify)". Only 10% HR managers reported (c), while 71% chose (b). This suggests that HR managers interpreted the "interview answer" as we meant them to do.

pair fixed effects α_p and we cluster standard errors by respondent r.

4.2 Results

Block 1 (Applicant Characteristics) Results

Table 3 reports the regression results of the first block. Column 1 reports the primary outcome, the wage that HR managers would offer to candidates. The results suggest that the wage premium for an applicant with advanced English proficiency is 15.9% (a $51.3 increase from a mean $323.2). The return to MNC experience is similar: all else equal, having MNC experience would increase the wage offer by 10.2% (a $33.1 increase). Moreover, a candidate with *both* advanced English and MNC experience further raises the return by 3.6%, or an additional $11.5. Thus, the results suggest that potential employers in this setting place particular value on experience acquired in an FDI firm when the individual speaks English, and is consistent with the model's assumption that lower communication barriers within MNCs should increase the general management skills acquired.

Although the resume rating exercise asked about hypothetical applicants and was not incentivized, these coefficients appear plausible. The return to English is remarkably consistent with the non-experimental Mincerian wage regressions in column 4 of Table 2, where a 1 sd increase in English is associated with a 16.1% higher wage. Since the DMs all work at MNCs, we cannot identify a MNC wage premium in our sample, but Alfaro-Urena et al. (2019) indicate that the MNC wage premium across several studies is between 5-10%. The estimated size premium is also consistent with the literature. In our hypothetical setting, HR managers would offer a 18.4% premium ($40.0 higher wage) to an applicant from a large 125-employee firm relative to a 25-employee firm, a magnitude consistent with the 18% large-size premium estimated by Reed and Tran (2019) on a harmonized set of household and labor force surveys across developing countries. As for the experience premium, our estimates are at the upper end the experience premium estimated by Lagakos et al. (2018), who find a premium of 16-30% across developing countries. However, their study compares workers with 5-9 years of potential work experience (years elapsed since finishing school, rather than actual work experience) relative to 0-4 years and, thus, likely to be a lower bound on the experience premium.

Column 2 reports the respondent's perception of how involved the candidate was in management at the previous job (1-4 scale).[29] Applicants with advanced English proficiency have a 0.15 higher perception of involvement off a mean of 2.50. Applicants with MNC experience have a 0.03 higher perception of involvement. We interpret this lower coefficient as the fact that MNCs are perceived as a challenging environment to be involved in when one does not speak English. By contrast, the HR managers attach a sizable increase in perceived involvement for applicants with both characteristics: the coefficient on the interaction is 0.14, which is statistically significant. This suggests that improving the English proficiency to advanced for an applicant with MNC experience greatly

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[29]The number of observations in the involvement regression is lower because this question was introduced after a fourth of the respondents had already completed the ratings.

improves the perceived involvement in management. Not surprisingly, overall work experience is the largest driver of the perceived involvement of the candidate.

Column 3 reports the results for "how much do you think the candidate has learned in their previous job" on a 1-10 scale. We find that perceived learning coefficients are higher for advanced English and MNC experience although we do not find the interaction statistically significant at conventional levels.

Block 2 (Mechanisms) Results

The second block explores the role of frequent communication with FMs as a mechanism for *why* profiles with high English proficiency and MNC experience are valued. Table 4 reports the results by examining respondent choices among profile pairs that vary in their hypothetical answers to three questions about their previous job: how frequently did the respondent communicate with their FM, how frequently did they use Microsoft Office, and how frequently they were involved in setting company targets.

The first column reports the wage offers for candidates. Candidates who interact frequently with FMs are highly desired; they would be offered a 9.9% higher wage relative to a candidate who did not frequently speak with their FM (a $40.8 increase over a mean of $410.2).[30] In fact, this increase is similar to the coefficient on candidates who frequently report using Microsoft Office (a $33.9 increase). This result supports the key mechanism that for general management positions, potential employers appear to desire candidates who interact with FMs, and they attach a valuation that is roughly similar to candidates who have a "hard" skill. Naturally, frequent involvement in management is most preferred, and HR managers would offer an even larger wage premium to such applicants (a $53.1 increase).

As discussed above, one worry is that profiles that indicate frequent communications with FMs reflect an unobserved attribute of that applicant. To gauge this selection story, we can examine the coefficient on the response that the candidate had been chosen to interact with the FM, but ultimately did not do so. We think that HR managers interpreted this response at face value (see footnote 28). The wage increase on this response is small ($2.8) and not statistically different from the leave-out category (infrequent communication with the 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 perceived learning. The results suggest that HR managers perceive learning to be higher for applicants who interact frequently with the FM. The coefficient implies a 0.52 higher perceived learning for applicants who frequently communicate with the FM relative to infrequent communication. As before, this perception is similar to the level of the hard skill (a 0.43 increase in perceived learning). We only observe a modest and statistically insignificant effect on the selection coefficient, and applicants who report being frequently involved in setting and communicating

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[30]Notice that the mean wage offer in Block 2 is much higher than in Block 1, which is consistent with the fact that we told recruiters these candidates have an Advanced English level and three years of experience in a large establishment owned by an MNC.

targets see a 0.84 increase in perceived learning.

Taken together, the evidence suggests that domestic employers value experience acquired by DMs' working in MNCs. Furthermore, workers that are proficient in English and those given the opportunity to work closely with FMs are particularly valued. The evidence is thus consistent with the model's assumption that management knowledge learned in MNCs is a *general skill*, in the sense of being valued in the labor market for domestic firms, and that this skill is learned, in part, through frequent communication with the FM. If the amount and content of such communication are non-contractible, the model suggests that the empirical evidence in this section would imply inefficiently low knowledge transfers. The social planner could curb the inefficiency by subsidizing DM's foreign language acquisition. A necessary condition for that to be the case is that DMs' foreign language proficiency and FMs' communication are *complementary*. We now turn to explore whether this is the case in our context.

5   Protocol 2: Complementarity Between Language Proficiency and Communication

This section explores the complementarity assumption. To do so, we offer English language training to a random sample of DMs. This allows us to track the effect of an (exogenous) increase in DMs language level λ on communication with FMs τ.

5.1   Research Design and Measurement

We recruited 298 domestic managers at 27 MNCs operating in the SEZ. As noted above, we classify domestic managers as MNCs employees of Myanmar nationality earning over \$200 per month, the income-tax reporting threshold in Myanmar and a plausible lower bound for holding a management position and interacting directly with senior FMs.[31]

The experiment design was as follows. Within each firm (a stratum), we randomly assigned half of the domestic managers to attend a free English training course. In total, 154 DMs were assigned to treatment. We contracted with an English-language company to provide the language training, which was entirely 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 taught its standard English for business course.[32] The sessions took place after working hours and on weekends, and we offered DMs the

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[31]We excluded Myanmar employees earning above the salary threshold if they held a technical occupation involving no supervision of subordinates (e.g., engineer or production technician), and brought into the sample frame 64 DMs below the salary threshold at the request of 18 firms.

[32]This course is very similar to a standard language course with daily life scenarios replaced with business situations. For example, the course would teach the correct article ("a" vs. "an") to use for the following positions: accountant, engineer, artist, receptionist, manager, doctor, consultant, pilot, etc. In the provider's regular course, they would use non-job related words. As another example, students would listen to a conversation and decide which of the following statements are true or false: "Jim Davis works in the advertising department", "Paula will be an intern in the company for three weeks", "Jonathan Ross is Jenny Bradshaw's assistant", etc.

option to take the course either at a rented space near the SEZ or at the company's main office in downtown Yangon. The provider's standard procedure is to conduct an initial English assessment to determine the student's knowledge (see Figure 1, Panel A) and place students into a beginners or intermediate course. We allowed the provider 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 staggered the training over nine cohorts through 2019. The typical cohort had around 15 DMs.[33] Throughout 2019, treatment and control DMs 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 the management simulation exercise.

Bloom and Van Reenen (2007) developed an approach to measure management practices that we implemented through closed-end questions. Measuring management *performance*, however, is challenging in our setting because DMs perform a range of tasks at firms that span a range of sectors. We designed a management simulation to assess DMs' management performance on a standardized task. The simulation exercise was structured as follows. The goal was to mimic the three-tier organizational structure of MNCs in our setting. An enumerator with advanced English proficiency acts as the "FM" by providing instructions in English to DMs to complete a task. The DM would then manage two "production workers" ("PWs"), performed by enumerators with no knowledge of English. These PWs were shielded from the "FM"-DM interactions so they could not hear the instructions. As is the case at the firms, the DM-"PWs" interactions occurred in Burmese.

The task simulates a common assembly-line task for production workers: precisely placing several items into a package. The task was to instruct the "PWs" 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 order were randomized across simulations to mitigate potential learning among the production workers, and there were a possible 192 combinations of tasks (see Table A.4). Production workers were also randomized from a pool of enumerators. We recorded the length of "FM"-DM and DM-"PWs" interactions, the number of questions, and the total mistakes completing the task. As we were concerned about experimenter's effects (e.g., treated DMs might exert more effort in the simulation as a result of having being assigned to treatment), we also performed a second placebo management task (for a different randomly drawn task) where the "FM" delivered the instructions in Burmese.

Due to the suspension of in-person surveys in Spring 2020 from Covid-19 lock-downs mandated by the Institutional Review Board, we switched from in-person to phone surveys to collect the main endline variables for 119 out of 298 DMs in the sample. We were unable to implement the management simulation on this sub-sample since the simulation requires a physical presence.

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[33]The first cohort had DMs from one firm and the remaining cohorts had DMs from between 4 and 11 firms.

5.2 Baseline Statistics and Empirical Specifications

Table A.3 reports baseline balance between the treatment and control individuals. The average age is 28.2 years with a tenure of 1.3 years. Across the sample, about 38% of DMs are men. The average monthly salary is $351.8. The table indicates that the randomization achieved balance across most observed covariates. Only age is marginally significantly different when comparing the treatment and control group, with treatment individuals being about 9 months older on average. The final row of Table A.3 reports attrition at endline. Some 9% of DMs refused the endline survey, a low attrition rate which is not significantly different between treatment and control groups.

We estimate intent-to-treat (ITT) using an ANCOVA specification (McKenzie, 2012):

$$y_i = \alpha_0 + \alpha_f + \beta treat_i + \gamma y_{0i} + \phi mode_i + \epsilon_i \tag{5}$$

The specification includes a firm f fixed effect to reflect the stratification, and i indexes the DM. Whenever possible, the outcome value is the average value of the variable measured through surveys that took place after 75% of the training had been completed and at endline. If an outcome was only measured at endline, we use just that value. The baseline value, y_{0i}, is the average value of the variable measured at baseline and during surveys that took place before 75% of the training had been completed.[34] We also include a dummy that turns on if the endline wave was collected over the phone during the Covid-19 lockdown. Standard errors are clustered by company department; there are 76 company-departments pairs.

We also present treatment-on-the-treated specifications (TOT):

$$y_i = \alpha_0 + \alpha_f + \beta takeup_i + \gamma y_{0i} + \phi mode_i + \epsilon_i \tag{6}$$

where $takeup_i$ is a continuous value between 0 and 1 based on the number of sessions attended out of 24 and is instrumented with treatment. Standard errors are clustered by department.

5.3 Results

We explore how treatment affects interactions with FMs. Before doing so, we first demonstrate that the intervention did, in fact, improve language proficiency for treatment DMs.

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[34]If a baseline value is missing, we set the value to zero and include a missing value dummy. For dropouts and non-takeup treatment DMs, we assign their survey schedule corresponding to the language course they should have attended. For control DMs, we assign survey schedules corresponding to the course attended by their treatment colleagues of similar English level. (If a firm had treatment DMs attending different courses, we assigned the schedule according to the majority of the treatment DMs). We conducted nine surveys via phone in addition to the (in–person) baseline and (in-person, and then phone due to Covid-19) endline surveys. On average, 2.71 surveys contribute to the baseline average value (2.82 for treatment DMs and 2.60 for control DMs) and 2.71 surveys contribute to the average endline value (same for treatment and control DMs).

Takeup and English Proficiency

Table 5 reports the first-stage results that regress takeup on treatment. Columns 1-2 report the attendance rates using two different definitions of takeup. Column 1 indicates that 45% of DMs attended at least three-quarters of the course (18 out of 24 sessions). Alternatively, column 2 reports the continuous takeup variable: on average, DMs attend, on average, 56% of the course. We use the continuous takeup measure in the TOT specifications.[35]

The more direct way to measure the impacts of the language course is to examine DMs' English proficiency at endline using our tailored test (using test questions that differed from the baseline test). Column 3 reports the impact on English test scores from being assigned to treatment: $0.16sd$. The TOT specification in column 4 shows an effect that is almost twice as large–$0.26sd$. 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 zero at the 10% level. Thus, the English training appears to have successfully improved the English proficiency for treatment DMs.[36]

Communication and Involvement

The model assumes a complementarity between English proficiency and communication with FMs. The top panel of Table 6 explores communication responses at endline.

We first examine the extensive margin of communication: is there an impact of the language training on the frequency of communication in the past 7 days? Columns 1-2 indicate a positive impact on communication frequency. Treatment DMs report a 0.20 increase from a baseline average value of 2.31 (on a 1-4 scale), and the TOT coefficient is 0.33. Columns 3-4 regress a dummy that turns on if the DM participated in a meeting with the FM in the last working day. While noisy, the results suggest a 0.07 increased probability of attending such meetings from a baseline average value of 0.43. On the intensive margin, columns 5-6 report that treatment DMs indicate losing less time due to translations and misunderstandings when they talk to FMs. The coefficients are, however, imprecisely estimated.

One may be worried that improved English leads to greater confidence and so more communication in the firm in general, not just with foreign managers. Moreover, one might worry about a Hawthorne effect where the results would be driven by treatment DMs wanting to please the researchers by answering more enthusiastically to all questions. To address both concerns, in columns 7-10, we turn to DM's interaction with another DM at a similar or higher level in the firm's hierarchy.[37] Treated DMs do not report talking more frequently with their domestic bosses/colleagues.

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[35]Figure A.5 shows the attendance distribution. Although an imperfect benchmark, the 76% initial-class attendance rate exceeds the average 65% initial-class attendance rate for training programs reviewed by McKenzie and Woodruff (2014).

[36]Although the training and setting is different from ours, Hoya et al. (2018) conduct an experiment on adults in the UK that teaches English as a second language through a 66-hour course. They find that improvement in English proficiency among treatment doubles relative to control individuals, and we find a similar impact (6.13 vs 3.01 points on a 100-point scale).

[37]If a DM's direct boss was a foreign expat, we would ask the respondent to identify also one Myanmar manager

They report attending meetings with a fellow DMs slightly more frequently but this result is insignificant and the effect measured is much smaller than the one observed with respect to FMs (columns 3-4). We conclude that English is complementary with communication between DMs and FMs specifically, and not with communication in general.

Panel B of Table 6 examines management involvement. We asked DMs to self-report their involvement on a scale of 1 to 4 in two broad management tasks: managing employees and setting targets. For the former, we asked how involved DMs were in setting individual targets for subordinates, promoting good performers, and hiring new employees for their team. For the latter, we asked how involved DMs were in communicating factory and team targets to subordinates. In columns 1-2, we find that treatment DMs increase their involvement in managing employees by 0.11, an effect that is both economically and statistically significant. However, we find no differential involvement of treated individuals in communicating targets (columns 3-4).

We then examine DMs' knowledge of management best practices in columns 5-6. We followed almost exactly the multiple choice questions in the "management practices" section of the U.S. Census's Management and Organizational Practices Survey (MOPS) which aims to get at the same practices as the qualitative questionnaire used in Bloom and Van Reenen (2007). We then score each question and obtain a total "management score".[38] When we moved to the phone endline due to Covid-19, we opted to reduce survey length and retained only the management questions about monitoring for this sample. The regression controls for this switch through the endline mode dummy. We do not observe any statistical difference between treatment and control in these management knowledge questions. Our interpretation is that the management practices questionnaires reflect *firm* policies that may not vary significantly across individuals. Additionally, as revealed below through anecdotal responses, the types of management learned by treatment DMs via the FMs are more specific than these management questions.

WTP for More Communication

We provide further evidence of the complementarity between language ability and communication. At the endline, we 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). Referring to our model, this corresponds to the DM's marginal benefit of learning from an additional unit of communication with the FM. Table 7 shows that treated individuals are willing to pay $32.67 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 $53.62 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

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(either a boss or somewhat at their level in the hierarchy).

[38]For example, we asked participants "What should managers' promotions primarily based on?" The proposed answers were "Solely performance and ability; Partly performance and ability, and partly other factors (for example, tenure or connections); Mainly factors other than performance and ability (for example, tenure or connections); Managers are normally not promoted."

be accounted for by "schmoozing" or a desire to influence FMs, rather than opportunities for further learning. In columns 3-4 of Table 7 we ask DMs for their WTP for a one hour conversation with a hypothetical FM working at a different firm. Control DMs are WTP less money to spend time with an FM outside their company (the control mean is $31.42 as opposed to $39.74), 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 $19.09 more than control individuals for this opportunity. This suggests that English skills increase the DM's valuation for time spent with a FM and provides further support for the complementarity assumption.

As with our communication results, one may be worried that improved English leads to greater confidence in one's ability to learn in general, not just from foreign managers. Moreover, one might worry about a Hawthorne effect, especially given that these WTP questions are not incentivized. To address both concerns, we also asked DMs about their WTP for a meeting with another Myanmar DM. The results are shown in columns 5-6 of Table 7. We observe no differential reported WTP between treatment and control.

Management Simulation

Participating firms operate across a wide range of sectors and, within those firms, DMs occupy a diverse set of roles. This makes it difficult to accurately measure DMs behavior and performance on the job through metrics that also enable a comparison across such a different range of firms, job titles and tasks. To overcome this measurement challenge, we present results from a management simulation exercise. The management simulation provides a way to measure performance in a controlled setting.

Table 8 reports the results. Columns 1-2 report the "PWs" time to complete the task when managed by the treatment DMs relative to control 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), so mistake-adjusted productivity improved.

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 0.35 more minutes relative to the control mean of 1.89 minutes; and, the TOT estimate is 0.67. 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 1.98 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 understand the task better by asking more questions.

As a placebo check, we performed the simulation exercise where the "FM" directed the management task in Burmese (for a new randomly drawn task). We would expect no difference in management performance between treatment and control firms in this placebo simulation, and this

is confirmed in Panel B of Table 8.

Skills Learned

Did treated DMs learn general skills from the FMs as a result of the language training? Interviews with treated DMs provide anecdotes that this might indeed have been the case:

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

- 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, 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".*

- DM, Japanese firm*: "Yes, my involvement with FMs has changed as I get involved in conversation with suppliers and customers more."*

Many of the skills listed in these examples (e.g., punctuality, confidence, problem solving, Microsoft Excel, customer relations) appear to be general.

Of course, it would be ideal to move beyond anecdotes and provide quantitative evidence on whether indeed treatment DMs learned general skills from FMs. Providing such evidence is challenging for two reasons, and why the resume rating protocol in Section 4 is an appealing way to test whether past interactions with FMs inside MNC is valued by domestic employers. First, the wide range of skills mentioned by the respondents suggests that designing a test to measure knowledge transfers is infeasible. For example, one could design a Microsoft Excel test, but such a skill would only be applicable to a subset of managers. The second challenge is that knowledge transfers would take time to materialize. Although managers can be tracked over time, it turns out that our ability to survey the sample through long-run followups was complicated by two large shocks. First, as discussed above, the Covid-19 pandemic forced us to complete the endline remotely, and limited our ability to conduct more detailed interviews about the set of skills learned (and how one could quantify them). Additionally, the pandemic may have slowed the knowledge transfers, as interactions between FMs and DMs fell substantially due to lockdowns. Nevertheless, we began a follow-up survey to assess knowledge transfers in January 2021, roughly a year after the language intervention. However, the military coup in February 2021 removed the democratically elected government from office and lead to general strikes, protests and an increasingly violent repression by the army. The ensuing chaos forced us to temporarily suspend this survey. We resumed in Fall 2021, and ultimately completed remote surveys for 219 DMs out of the total 298 DMs. The

relatively high attrition due to the two shocks may limit our statistical power to detect effects on outcomes of interest.[39]

The survey was designed so that DMs would choose amongst a list of 17 skills those that they perceived to have learned from their FMs. The skills can be classified into three broad categories: soft skills (e.g., negotiating, business etiquette, customers relations, written communication, professionalism), hard skills (e.g., software packages, like Excel and SAP), and business skills (e.g., manpower planning, supply chain management).

We estimate potential differences between treatment and control DMs separately by category, and condition on skill and strata fixed effects for each regression (clustering standard errors by department, as before). Panel A of Table A.6 reports the findings. Columns 1-2 indicate that treatment DMs report having more soft-skills than control. Unpacking this result, treatment DMs report higher problem solving/negotiating skills, and also higher confidence, professionalism, and customer relations, although individually these latter three are not statistically significant at conventional levels. Columns 3-4 and 5-6 indicate no differences in reported hard skills or business skills. These results suggest that treatment DMs learned more soft skills, which are quite general in nature, as a result of their interactions with FMs, but not hard or business skills (which may be slightly easier to codify than soft skills, and hence easier for control DMs to learn). As the soft skills in the list are general, this suggestive evidence is consistent with, and complements, the findings from resume rating protocol..

We also attempted to track changes in labor market outcomes. We collected outcomes on salaries, exits from the MNC, and applications to new job postings at both the endline and the followup survey. Panel B of Table A.6 reports the results.[40] Treatment DMs do not report higher salaries (columns 1-2) nor are they more likely to have left the company (columns 3-4). However, treatment DMs report applying to 0.22 more jobs than control DMs (columns 5-6). On the one hand, this is suggestive that treatment DMs perceive to have better outside options. On the other hand, expanded opportunities to learn in the MNC also increases the opportunity cost of accepting an outside job. This, combined with the two concurrent negative economic shocks, likely limits our ability to detect actual changes in salaries or job switches.

5.4 (No) Spillover to Control DMs

A potential concern with the above results is that the impact of the language training on treatment DMs may come at the expense of the control group. While this is not a substantial concern for outcomes such as acquisition of language skills or management skills which are non-rival, the means through which the latter is acquired, communication with FMs, may be a rival good (particularly so if FMs are constrained in their total communication budget).

Our randomization procedure was not designed to tests for spillovers on control DMs. Such a

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[39]The attrition for treatment is 23.38% and for control is 29.86% and the -6.31% difference is not statistically significant at conventional levels (p-value is 0.25).

[40]The regressions follow the approach in (5) and (6) by averaging outcomes collected at the endline and post-endline follow-up, control for baseline wage, include strata fixed effects and cluster standard errors by department.

design would have varied the intensity of treatment DMs across FMs. Instead, we stratified by firm, and this leads to potentially random variation in the share of treatment DMs across departments within the firm. We choose the department level, described above, as the unit of analysis for spillovers because it represents a relevant unit of management for DMs, with typically at least one FMs above and subordinates under them. On average, each control DM is in a department with 4.8 (sd: 3.2) other sample DMs, 2.7 (sd: 2.1) of whom are treated.

We examine the extent to which control DMs are affected by the intensity of treatment in their department by running the following specification:

$$y_i = \alpha_0 + \alpha_f + \beta \#Treated_d + \gamma size_d + \epsilon_i$$

where $\#Treated_d$ is the number of treated DMs working in the same department and $size_d$ is the total number of sample DMs working in the same department of control DM i. As in the previous specifications we control for strata (firm) fixed effects α_f. Table A.7 shows results for the main outcome variables: English knowledge, communication, involvement, WTP for FM meetings, and management simulation. Overall, we are unable to find effects along any of these outcomes, which is suggestive that control DMs were not crowded out by treatment DMs.

6   Further Evidence

In this section, we provide additional suggestive evidence that supports the presence of an inefficiency in our setting and justifies a language subsidy. First, we discuss evidence that supports the assumption of non-contractible communication. Second, we discuss evidence that supports the other conditions that make a language subsidy potentially effective.

6.1   Non-contractible Communication

Our main justification for the non-contractibility assumption is that is a feature of the workplace, and is therefore a cornerstone of workhorse frameworks in organizational economics.[41] The non-contractible nature of communication in our context is supported by two pieces of empirical evidence. First, as discussed in Section 5.3, we asked DMs to report their willingness to pay (WTP) for an hour of "one-on-one" conversation with their FM. If communication is non-contractible, we should expect a sizable wedge between the reported WTP by the DMs and the opportunity cost of time of the FMs (their hourly wage) in our sample. Panel A of Figure A.6 reports the distribution of the DMs WTP, as well as the average and max hourly wage of FMs in our sample. 67% of DMs report a higher WTP than the average FM hourly wage and 51% report a higher WTP than the

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[41]An important question is whether relational contracts between the DM and FM can overcome the non-contractibility of communication (Gibbons and Henderson 2012). This is unlikely for several reasons. Relational contracts achieve first-best if parties are sufficiently patient. In our setting, the FM and DM have a relatively short horizon to develop a collaboration: the DMs will leave the MNC, and the FMs may return home. Second, a well-functioning relational contract requires parties to clearly understand the terms of the relationship (e.g., Chassang 2010, Gibbons et al. 2021). The lack of common language–the key friction in our setting–makes this harder. Finally, compared to a benchmark with perfect contractibility, Garicano and Rayo (2017)'s model argues that knowledge transfers through relational contracts are slow and incomplete.

hourly wage of the best paid FM in our sample. This wedge suggest that additional communication between DMs and FMs could increase total surplus.

Second, at the longer-run follow-up survey in 2021, we began to ask DMs to report how many hours they spent talking with their FM in the past week and how many hours they would have liked to spend talking with their FMs over that same period. Under the non-contractibility assumption, we should also expect seeing a wedge between the *ideal* and the *actual* communication time. Panel B of Figure A.6 shows the distribution of values reported by DMs who had responded to the survey before it was halted in February.[42] On average, in the seven days preceding the survey, DMs would have liked to talk to their FMs 1.4 hours more than they actually did: the *actual* time is thus lower than the *ideal* one.[43]

Taken together, this evidence suggests that there is a gap between the level of communication desired by the DM and what is provided by the FM.

6.2 Support for the Language Subsidy

The model argues that the *general skills* and the non-contractibility assumptions are sufficient to create an inefficiency. However, the rationale for the planner to implement a language subsidy and partially correct that inefficiency relies on additional assumptions. In particular, a subsidy is justified if the DM's choice of English proficiency does not fully internalize the returns of her language investment for the MNC. If either (i) the FM and DM can contract on the DM's language skill level or (ii) the English wage premium reflects the marginal value of DM's English knowledge in the MNC ($w'(\lambda) \geq \frac{1}{\gamma}$), the DM's privately optimal language investment would be the same or larger than the one desired by the planner.

With respect to (i), we explored DM's and FM's ability to contract on DM's English proficiency implementing a limited experiment during the language training program. For a short period, we offered an incentive (in the form of mobile phone credit worth $10) conditional on the DM attending a class. We randomized whether this payment was made to the DM or to the FM. In the spirit of Bubb et al. (2018), the logic of the test is that if the two parties can reach an agreement to split the surplus created by language training, the identity of the recipient of the payment should not matter for attendance. If, instead, the identity of the recipient matters, it suggests that parties are unable to maximize and share the joint surplus. We find that the DM's random assignment to receiving the incentive increases attendance by 6 percentage points (up from a baseline probability of 57%), but the FM's random assignment to receive incentive has no effect on the DM's attendance. This provides suggestive evidence that DMs and FMs are unlikely to be able to contract on the level of English knowledge.

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[42]To reduce respondent burden, we did not include this question when we resumed the survey in Fall 2021.

[43]Note that if communication was contractible, we would expect the DM to pay for it, in some form. At work, DM's wages are positively correlated with communication with the FM, the opposite of what we might expect. Of course the DM might be able to compensate the FM in other ways, e.g., through favors. Although there does not appear to be much evidence of DM and FM in our sample interacting outside of working hours, we cannot completely rule out such possibility.

With respect to (ii), back-of-envelope calculations also suggest that the marginal benefit of language skills for the MNC are significantly larger than the DM's English wage premium ($w'(\lambda) < \frac{1}{\gamma}$). We calibrate the marginal benefits of the language training to the MNC ($\frac{1}{\gamma}$) using the management simulation results in Section 5.3. On the benefit side, the production workers perform the task faster if managed by treated DMs (15%, column 1 of Table 8). We multiply the estimated productivity gain by the average monthly wage of PWs in the firm and by the average span of control of DMs in the firm.[44] On the cost side, FMs spend more time communicating with DMs (19%, column 5 of Table 8). We multiply this estimate by the average share of FM's time spent talking with DMs (6%) and by the monthly wage of FMs at the firm. Our estimate for the average (gross) benefits of the language training for MNCs ($\frac{1}{\gamma}$) is thus $19 per month. We compute the DM's returns from improving English ($w'(\lambda)$) using estimates from the resume ratings experiment. When the English level of the DM goes from *elementary* to *advanced* (an increase of 2.2 sd in the DMs English skills distribution) the monthly wage offer increases by $51.3 (column 1 of Table 3). The language training increases the English level of DMs by 0.16 sd, so the expected wage increase from the language training we offer is $3.6 per month, about 5 times smaller than the MNC's. The data thus suggest that indeed $w'(\lambda) < \frac{1}{\gamma}$.

Applying a conservative 10% annual discount factor, the estimates above imply that DMs would not pay for the training on their own (See Figure A.7, Panel A). This is consistent with the model assumption that DM's investment in English is *privately* optimal and with DMs self-reported willingness to pay for a training program similar to the one we offered. Assuming a conservative 3% probability that the DM leaves each month, the NPV of providing the training is also negative for most MNCs in the sample (see Figure A.7, Panel B).[45] Note, however, that the joint returns for DMs and MNCs from the training are positive in 35.9% of cases, but only two MNCs had offered an English language training before our intervention, bringing us back to point (i). As we conclude, it is worth reiterating that the purpose of our intervention was *not* to evaluate the particular training program we offered but rather to establish a rationale for some kind of intervention. For example, fostering language acquisition in school might be more effective as foreign languages are better learned at a younger age (Dixon et al. 2012).

7   Conclusion

Countries across the developing world open their fiscal coffers to attract MNCs in the hopes that their superior operational practices will spillover to domestic companies. We focus on one particular aspect—language barriers—that may impede the initial spark to knowledge transfers, and explore conditions that would justify policies to complement the typical package of tax incentives, land acquisition, and infrastructure investments that attract MNCs.

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[44]We assume decreasing returns in the span of control (see Figure A.7 for details).

[45]These estimates are consistent with our observation that very few firms had paid language training courses for their staffs before our intervention. The vast majority of the firms however were very eager that we offer the training, suggesting that the trainings would be beneficial to them.

Our setting—MNCs in Myanmar—is a specific one, but we believe that many of its characteristics would be relevant in other settings. The use of English as the lingua franca at the workplace is common throughout the globe. When DMs in the host country have low proficiency, we would expect communication barriers to be large. Analogously, we would expect similar communication barriers to arise when workplace communication occurs in the FMs' native tongue. For example, Uganda recently added compulsory Mandarin education to selected secondary schools, presumably to take advantage of the large inflow of Chinese FDI in recent years. And, of course, many countries have implemented mandatory English-as-second-language policies starting as early as primary school. There are, of course, many justifications for such policies, the benefits of potential knowledge transfers from FDI are one specific example. Indeed, Rodrik (2004) argues for language training as an industrial policy because of its potential to raise the process of self-discovery in developing countries.

There may be additional inefficiencies that policymakers should correct in order to increase the likelihood of positive spillovers from MNCs. These could include the provision of infrastructure, removing information frictions to improve matches between MNCs and domestic suppliers, and addressing credit constraints of existing or potential employees. The approach we take in this paper—to clarify the conditions under which the planner should intervene and to design a set of experimental protocols to explore these conditions—could be adopted to explore frictions that may impede spillovers in other settings.

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Tables and Figures

Table 1: Summary Statistics

	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: Table reports summary statistics from 2018 survey. The † indicates data collected from administrative records collected by the SEZ's management committee. The variables denoted by ‡ indicate firm-level information collected from interviews with a senior human resource manager at the MNCs.

Table 2: English Proficiency and Communication

	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

Notes: Table shows regressions of management, communication and wage outcomes on DMs' standardized English test score, as measured by the language test conducted at the 2018 survey. Column 1 is is the score on the 15 MOPS management practice questions. Column 2 is the average score of self-reported involvement in managing people and setting targets at their job, on a scale from 1 to 4 (with 1="I'm not involved in this at all" and 4="There's never a discussion without me and I make the final decision"). Column 3 is the frequency of interaction with the FM, on a scale from 1 to 4 (with 1=never, 2=seldom, 3=often, 4=very often). Column 4 is log monthly salary. Columns 5-6 report DMs' responses with respect to either the FM or a Myanmar manager. In these regressions, there are two observations for each DM, the DM's standardized English score is interacted with dummy that turns on if the interlocutor is an FM, and the regressions include DM fixed effects. Column 6 is the percentage of time lost in translation in a 60 min conversation with the supervisor. Standard errors are reported in parenthesis. In columns 1-4 they are clustered at the department level, and in columns 5-6 they are clustered at the DM level.

Table 3: Characteristics Valued by HR Managers: Demographics

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

Notes: Table shows regressions of hypothetical resume characteristics on wage offers, involvement score and learning scores as stated by the 51 HR manager respondents. The first column reports the wage offer stated by the respondent for each profile. Column (2) reports the respondent's rating of how involved the profile was in setting and communicating targets and managing people at the previous job on a scale from 1 to 4. Column (3) reports the respondent's rating of how much the profile would have learned at the previous job on a scale from 1 to 10. The leave-out group for English and FDI contains resumes displaying elementary English and experience in a domestic firm. The leave out for age, gender, company size, and total experience is age 25, female, firm size of 25 employees, and 1 year work experience, respectively. All regressions include respondent fixed effects and pairs of resumes fixed effects. Standard errors are reported in parenthesis and are clustered at the respondent level.

Table 4: Characteristics Valued by HR Managers: Interview Responses

	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

Notes: Table shows regressions of hypothetical job candidate characteristics on wage offers and learning scores as stated by the 51 HR manager respondents. Dependent variable in the first column is the wage offer stated by the respondent for the profile. Dependent variable in the second 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 leave-out cell is for profiles that display infrequent communication with their FM, infrequent MS Office user, and infrequent involvement in setting and communicating targets. All regressions include fixed effects for respondents. Standard errors are reported in parenthesis and are clustered by respondent.

Table 5: Take-Up and 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	0.568	0.155	0.260	0.187	0.313	0.141	0.236
	(0.048)	(0.036)	(0.074)	(0.116)	(0.097)	(0.151)	(0.107)	(0.168)
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				276.76		272.58		275.11
R2	0.37	0.58	0.47	0.48	0.46	0.47	0.29	0.30
N	298	298	267	267	265	265	265	265

Notes: Table reports treatment effects on takeup of English classes and English score. Column 1 is takeup defined as a dummy that turn on if the DM attended at least 18 out of 24 sessions. Column 2 is takeup defined as the share of the classes attended (a continuous value between 0 and 1). Columns 3-4 is the standardized English score measured at endline. Columns 5-6 is the standardized English speaking score. Columns 7-8 is the standardized English listening score. Columns 3-8 control for baseline values of the dependent variables. If a baseline value is missing, we set the value to zero and include a missing value dummy. All regressions control for the mode of endline and include strata fixed effects. Standard errors are reported in parenthesis and clustered at the department level.

Table 6: Communication and Management

Panel A: Communication

	FM						Domestic Boss/Colleague			
	Talk Fqcy (1-4)		Attend mtg (0/1)		Time lost (%)		Talk Fqcy (1-4)		Attend mtg (0/1)	
	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treatment	0.192	0.314	0.072	0.119	-1.969	-3.244	-0.030	-0.049	0.039	0.064
	(0.104)	(0.158)	(0.055)	(0.084)	(2.092)	(3.186)	(0.107)	(0.165)	(0.056)	(0.087)
Baseline control	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	2.58	2.58	0.43	0.43	17.45	17.45	3.11	3.11	0.71	0.71
1st stage F-stat		307.92		287.64		281.57		306.88		287.64
R2	0.27	0.27	0.27	0.28	0.22	0.22	0.14	0.14	0.15	0.15
N	226	226	261	261	223	223	258	258	261	261

Panel B: Management

	Involvement (1-4)				Score (/15)	
	People		Targets		Management	
	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.111	0.187	-0.007	-0.013	0.070	0.117
	(0.062)	(0.096)	(0.089)	(0.141)	(0.114)	(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	2.66	2.66	6.32	6.32
1st stage F-stat		269.48		257.33		282.64
R2	0.67	0.68	0.39	0.39	0.94	0.94
N	277	277	277	277	272	272

Notes: Panel A reports treatment effects on communication outcomes. Columns 1-2 is communication frequency with the FM (scale from 1 to 4, with 1=Never, 2=Seldom, 3=Often, 4=Very often). Columns 3-4 is the probability that the DM attended a meeting with an FM in the last working day. Columns 5-6 is the share of conversation lost due to tanslation issues as a percentage. Columns 7-8 is communication frequency with a DM. Columns 9-10 is the probability of attending a meeting with a DM. Panel B reports treatment effects on management. Columns 1-2 is the involvement in the management of personnel (on a scale of 1-4, 1=Not involved at all, 2=Rarely involved, 3=Sometimes involved, 4=There is never a discussion without me and I make the final decision). Columns 3-4 is involvement in setting targets (same scale). Columns 5-6 is the score on the 15 MOPS management questions. Except for the meeting outcomes, which were only collected at endline, all regressions control for the average value of the dependent variable at baseline and at intermediary surveys before 75% of the treatment. If a baseline value is missing, we set the value to zero and include a missing value dummy. All regressions control for the mode of endline and include firm fixed effects. Standard errors are reported in parenthesis and clustered at the department level.

Table 7: DMs' Willingness-to-Pay for Additional Meetings

	FM		FM outside firm		DM	
	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	32.7	53.6	19.1	32.3	7.7	12.6
	(13.7)	(20.9)	(8.3)	(13.0)	(7.1)	(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

Notes: Table reports treatment impacts on willingness-to-pay (WTP) for a one hour, one-on-one conversation with different managers. Columns 1-2 is the WTP for time with the FM. Columns 3-4 is the WTP for time with a (hypothetical) FM at another MNC. Columns 5-6 is the WTP for time with a Myanmar manager. All regressions control for the mode of endline and include strata fixed effects. Standard errors are reported in parenthesis and clustered at the department level.

Table 8: Management Simulations

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

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

Notes: Panel A reports the treatment effects on the outcomes of the management simulation exercise in which instructions were given in English. Columns 1-2 is the time taken by the DM's "production workers" to complete the task. Columns 3-4 is the number of mistakes made by the DM's "production team" compared to the instructions. Columns 5-6 is the time in minutes spent by the DM talking with the "FM". Columns 7-8 is the number of questions asked by the DM to the "FM". Panel B shows the results of the simulation exercise in which instructions were given in Burmese. The management simulation was collected at endline on N=153 DMs in 20 firms, and was then halted because of Covid-19 lockdowns. All regressions include strata fixed effects. Standard errors are reported in parenthesis and clustered at the department level.

Figure 1: English Proficiency of DMs and FMs

Panel A: English Test Scores, Language Provider Test
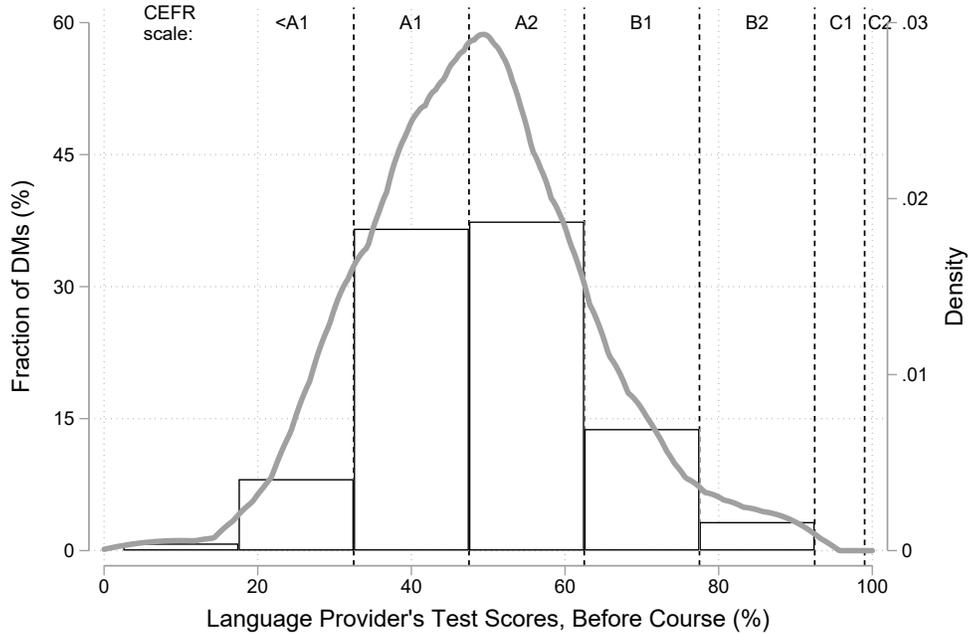
Panel B: English Test Scores, Baseline Survey
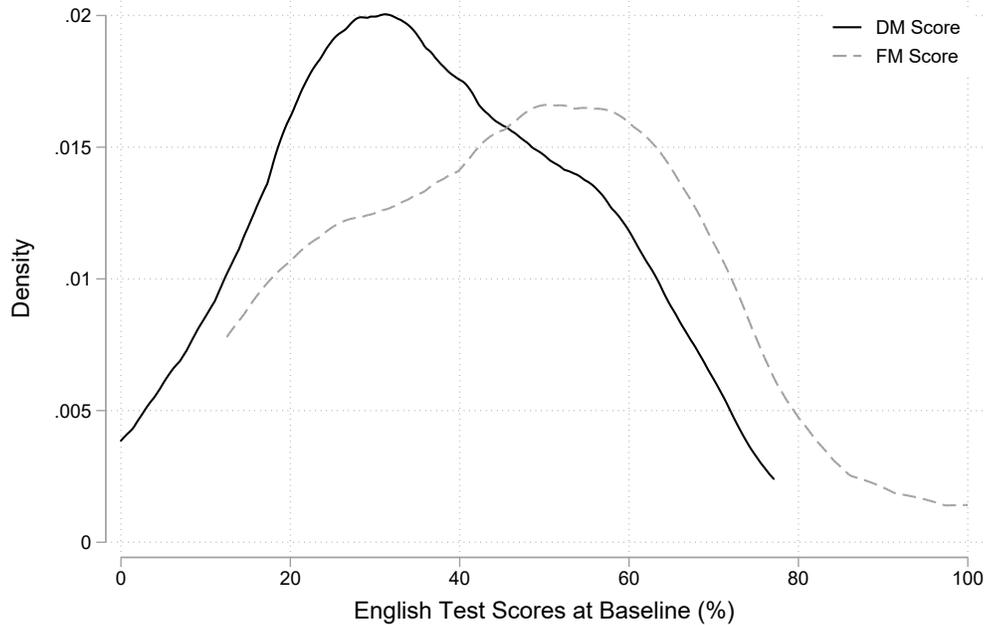
Notes: Panel A reports DMs' scores on the English test administered by the training provider before classes commenced. This test was administered to treatment DMs who came to the first session of the course; N=123. The grey line reports the density of scores (right axis), and the histogram reports where DMs would be classified according to the CEFR scale (left axis). Panel B reports the distribution of DMs' and FMs' English scores from our tailored language tests conducted in the pre-experiment survey in August 2018 (N=400 for DMs, N=23 for FMs). The test scores are the averages of a multiple choice listening test and a speaking test which was graded by two external language teachers. Figure A.3 displays the strong positive correlation between the two tests for the sample of DMs that took both. The CEFR scale comprises the following levels: *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.

A. Appendix Tables and Figures

Table A.1: Summary Statistics of Human Resource Managers

	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

Notes: Table reports summary statistics of the 51 HR managers at domestic firms recruited for the resume rating protocol.

Table A.2: Donor Pool of Characteristics and "Interview" Responses

Panel A: Donor Pool of Profile Characteristics

Criteria	Values
Gender	{Male, Female}
Age	{25, 26}
English level	{Elementary, Advanced}
Previous company ownership	{Myanmar, Japanese}
Previous company size	{25 employees, 125 employees}
Work experience	{1 year, 3 years}

Panel B: Donor Pool of Interview Responses

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: Panel A reports the donor pool of values for each demographic characteristic. Panel B reports the donor pool of values for each response to the "interview" questions.

Table A.3: Baseline Balance for Language Experiment

	Control	Treatment diff	N
Male (%)	-0.00	0.00	298
	(0.04)	(0.05)	
Education (yrs)	6.97	0.04	298
	(0.04)	(0.06)	
Age (yrs)	28	1	281
	(0)	(1)	
Tenure (yrs)	2.34	0.03	298
	(0.08)	(0.11)	
Big 5 (z score)	-0.74	0.15	298
	(0.09)	(0.13)	
Monthly salary (USD)	312	20	273
	(28)	(42)	
English score (%)	53.87	0	298
	(1.96)	(3)	
Involvement score (1-4)	2.86	0	298
	(0.06)	(0)	
Management score (/15)	9.34	0	298
	(0.12)	(0)	
Time lost with FM (%)	17.34	3	284
	(2.05)	(3)	
Talk Freq. FM (1-4)	2.79	-0	286
	(0.06)	(0)	
Endline attrition (%)	0.04	-0	298
	(0.02)	(0)	

Notes: Table reports the baseline balance for the language experiment. Each outcome is regressed on treatment and firm (strata) fixed effects. Standard errors are clustered at the department level. The first column reports the constant and its standard error. The second column reports the coefficient on treatment status and its standard error. The p-value of joint significance test for the 11 variables (excluding attrition) to predict treatment status is 0.37. The last row reports attrition at endline.

Table A.4: Management Simulation

Step	Action
Selecting Objects	"FM" names a characteristic common to 4 (of 8) objects. Eg. items made of plastic, found on an office table etc. DM must identify the 4 objects by name to the "PWs". (6 possible combinations)
Order	Each object has a tag indicating price and weight. Order of placement is determined by the metric {price, weight} in {increasing, decreasing} order. (4 possible combinations)
Placement	"FM" indicates that objects not selected must be disposed {below the table, aside the selected object} and the box must be placed on the {ground, table}. In addition, "FM" specifies a third placement requirement of objects within the box {vertical, horizontal} (8 possible combinations)
Possible mistakes	1. Incorrect objects 2. Incorrect disposal of rejects 3. Incorrect box placement 4. Incorrect order of arrangement 5. Incorrect placement of shipment items

Notes: Table reports the details of the management simulation exercise. A management task is a randomly drawn action from the three steps. The "FM" draws a task and provides the instructions to the DM. To complete the task, the DM supervises two "PWs". Each DM received two tasks, one delivered in English and another delivered in Burmese. The last panel indicates the possible mistakes that were recorded. We record the total time to execute the task and the times spent communicating with the "FM" and the "PWs".

Table A.5: English Usage Outside of 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

Notes: Table treatment effects on the use English outside of the workplace. DMs were asked "what have you used English for in the past six months" and provided with the nine possible choices described in the top row. DMs could select as many choices as they wanted. This question was dropped from the endline questionnaire after the switch to phone surveys due to Covid-19 restrictions. All regressions include strata fixed effects. Standard errors are reported in parenthesis and are clustered at the department level.

Table A.6: Medium-Run Skills and Labor Market Outcomes

Panel A: Skills

	Soft skills		Hard skills		Business skills	
	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.073	0.123	0.009	0.015	-0.005	-0.008
	(0.040)	(0.064)	(0.038)	(0.062)	(0.025)	(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

Panel B: Labor market outcomes

	Log salary		Left SEZ company		Applications	
	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(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

Notes: Panel A reports treatment effects on learning skills as reported by the respondents during the follow-up survey in 2021. The unit of analysis is a respondent-skill pair. Respondents were asked to choose amongst a list of 17 skills that they perceived learning from their FMs. Columns 1-2 report treatment impacts on soft skills: problem solving/negotiation/attention to detail, customer relations, business etiquette, confidence, professionalism, written communication. Columns 3-4 look at treatment impacts on 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). Columns 5-6 report treatment impacts on business skills: financial management/budget control, general administrative skills, manpower planning, marketing strategy, supply chain management, international business knowledge (e.g. Kaizen). All regressions include skill fixed effects and strata fixed effects, a wave dummy (as discussed in the text, the survey was conducted in January 2021 and October 2021), and standard errors clustered by department.

Panel B report treatment effects on labor market outcomes. These data were collected at the endline and the 2021 follow-up survey. The unit of analysis is respondent: for wages and applications, we take the average of post-treatment values collected. For exits, we take the maximum of a post-treatment indicator if the respondent had left the firm. Columns 1-2 is the log wage in USD. Columns 3-4 is an indicator if the DM left their job at the MNC. Columns 5-6 is the number of jobs they report applying to in the past six months. All regressions include strata fixed effects. We control for the baseline value of wages; if missing, we set to zero and include a missing wage dummy. For wages as outcomes and exits, we complement with administrative data when possible. Standard errors clustered by department.

Table A.7: Spillovers to Control DMs

	Panel A: English and Communication					
	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)
N Treatment in Department	-0.122	-0.032	-0.983	-0.064	-0.111	18.510
	(0.077)	(0.104)	(3.697)	(2.207)	(0.087)	(12.486)
N Total in Department	0.063	-0.005	1.726	1.677	0.059	-7.653
	(0.044)	(0.069)	(2.264)	(1.212)	(0.053)	(8.757)
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	0.33	0.72	0.21
N	126	104	88	103	130	98

	Panel B: Management simulation							
	Instructions in English				Instructions in Burmese			
	"PWs" Time (1)	"PWs" Mistakes (2)	"FMs" Time (3)	"FM" Questions (4)	"PWs" Time (5)	"PWs" Mistakes (6)	"FM" Time (7)	"FM" Questions (8)
N Treatment in Department	0.264	-0.048	-0.209	-0.165	-0.091	-0.058	-0.038	0.103
	(0.145)	(0.187)	(0.073)	(0.255)	(0.065)	(0.127)	(0.069)	(0.244)
N Total in Department	-0.156	0.095	0.146	-0.007	0.056	0.047	0.055	-0.032
	(0.098)	(0.134)	(0.047)	(0.260)	(0.040)	(0.076)	(0.046)	(0.151)
Baseline control	No	No	No	No	No	No	No	No
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	1.28	1.85	1.89	1.97	0.88	0.63	1.15	1.27
R2	0.23	0.26	0.60	0.39	0.34	0.28	0.33	0.12
N	75	75	75	75	75	75	75	75

Notes: Table examines spillovers to control DMs. In each column, we regress the outcome of interest at endline on the number of treated DMs working in the same department as the control DMs. We control for the total number of DMs in the department (measured at baseline). Panel A examines English and communication outcomes. Panel B examines outcomes from the management simulation.
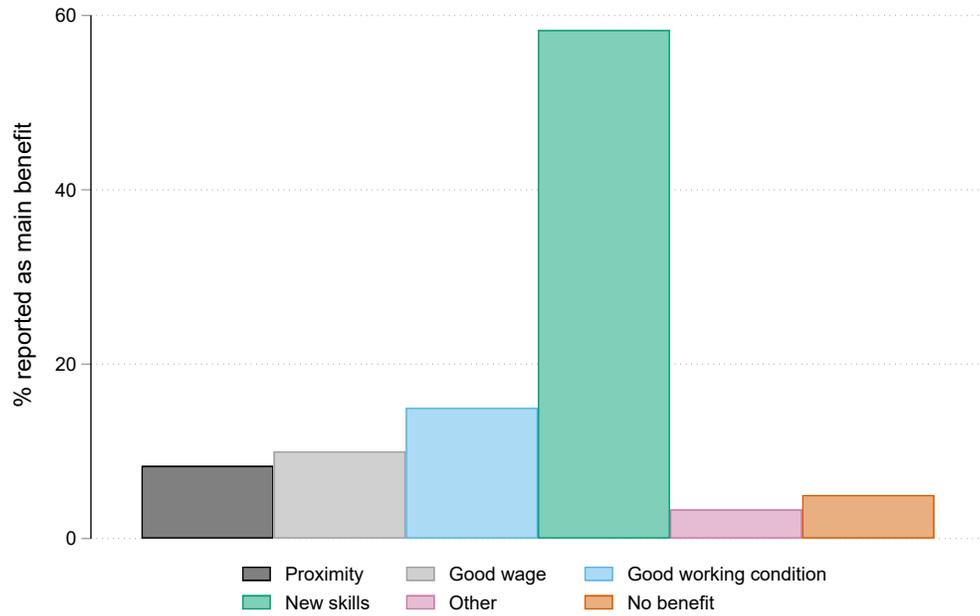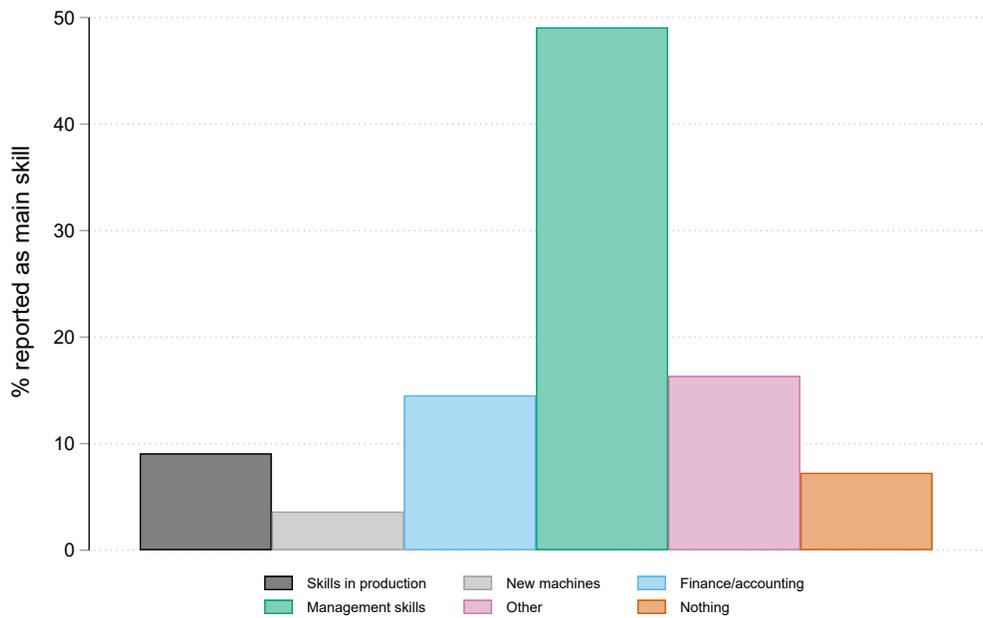
Figure A.1: Firms by Origin and Sector
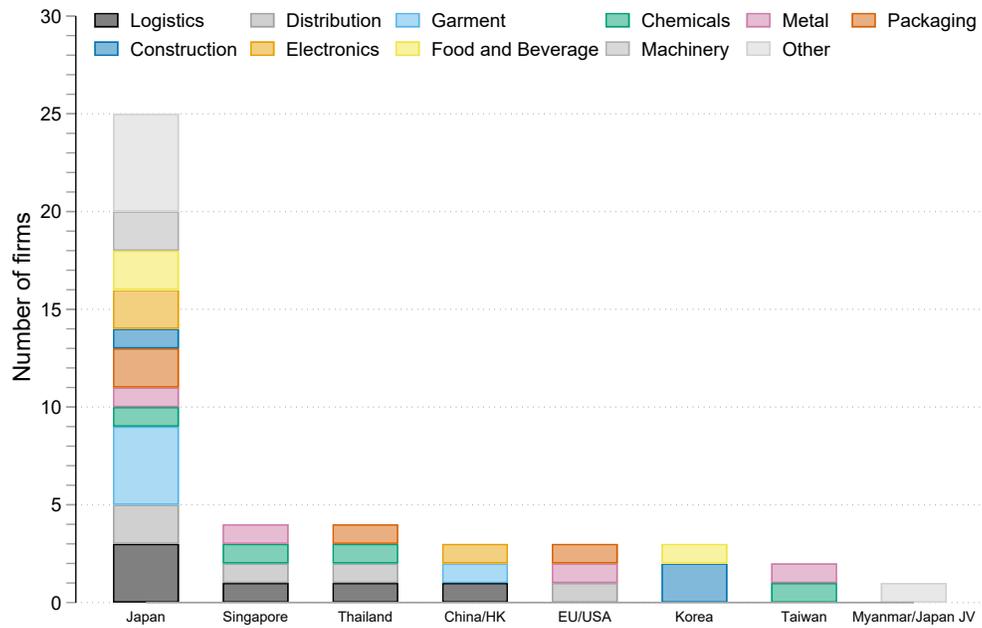
Notes: Figure displays the origin and sectors of the MNCs operating at the SEZ in 2018. One firm is majority Myanmar owned but is partially owned by a Japanese consortium and the CEO of the firm is an foreign expat, and so we include this firm in the analysis.

Figure A.2: Employees' Reasons for Working at the MNCs

Panel A: Benefits of Working at MNCs

Proximity   Good wage   Good working condition
New skills   Other   No benefit

Panel B: Skills Expected to Learn

Skills in production   New machines   Finance/accounting
Management skills   Other   Nothing

Notes: Figure displays the share of DMs who reported the particular benefit as their primary benefit of working at MNCs in the SEZ (Panel A) and the share of DMs that reported the particular skill as the primary skill they were hoping to acquire (Panel B). These data come from a pilot survey conducted in June 2017.

Figure A.3: Comparison with Language Provider's Test

Notes: Figure displays a scatter plot and the line of best fit of the score obtained in the test administered by language training provider and the score obtained on our tailored English test for the N=123 DMs who took both assesments.

Figure A.4: Proficiency of DMs in Native Language of FMs and Vice Versa
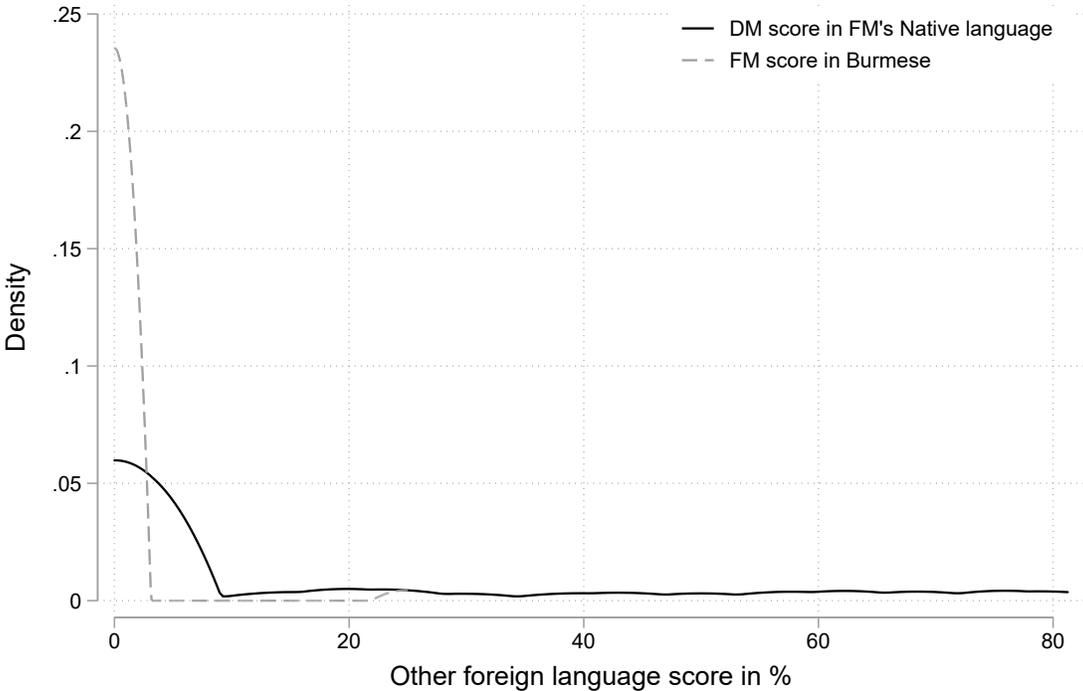
Notes: Figure displays the distribution of DM test scores on the native language of FMs at their company, and the distribution of FM test scores in Burmese.

Figure A.5: Attendance by Treatment DMs
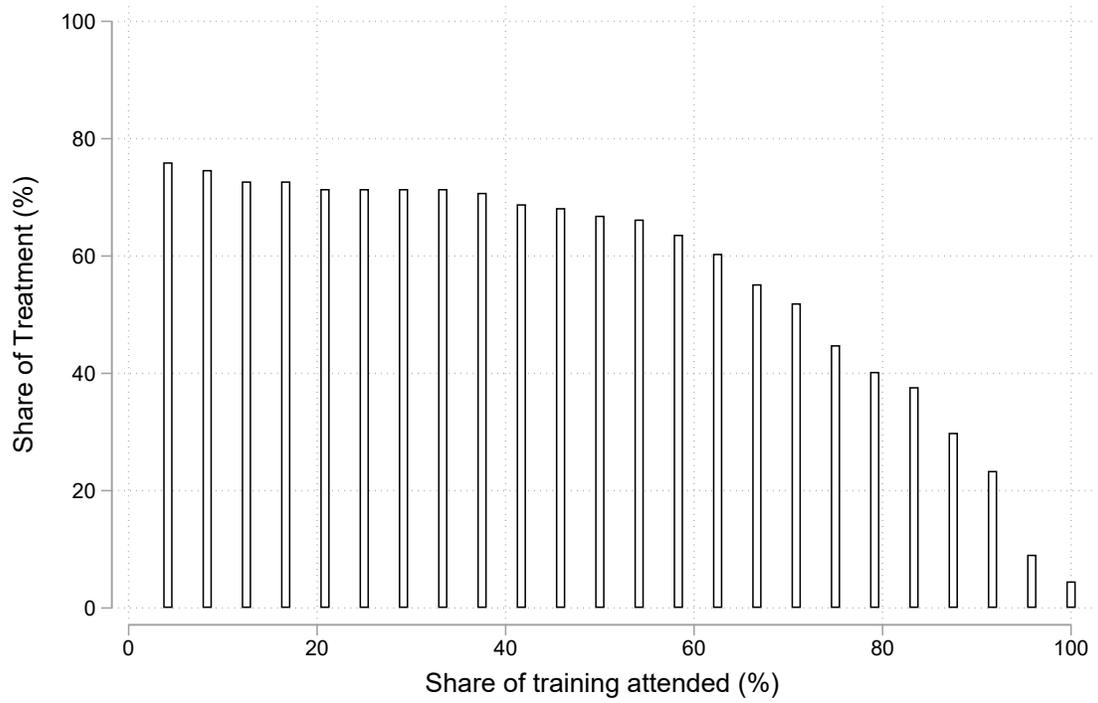
Notes: Figure plots the distribution of attendance of treatment DMs at the 24-session language training, for DMs who showed up to at least one session. The unit is the number of sessions (each session lasts two hours).
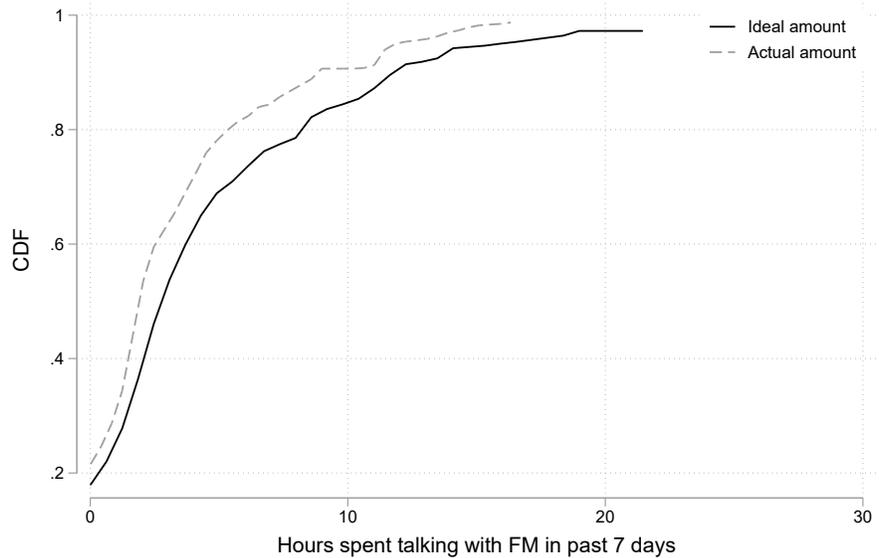
Figure A.6: Non-Contractibility of Communication

Panel A: DMs WTP for a one-hour Meeting with the FM
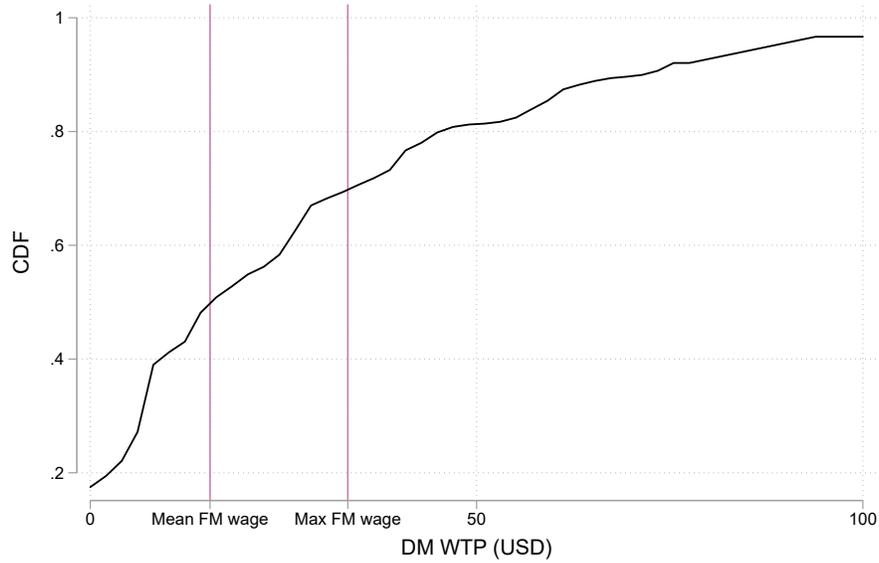
Notes: Figure plots the empirical cumulative distribution of the DMs WTP for a one-hour "one-on-one" conversation with their FM. The vertical bars show the mean and maximum FM hourly wage.

Panel B: Ideal vs Actual communication

Notes: Figure plots the empirical cumulative distribution function of the quantity of time (in hours) DM spent talking with their FM in the past seven days, and the quantity of time they would have liked to spend talking with their FM in the past seven days. This question was asked to 219 DMs at the follow-up survey in 2021, which was halted due to the military coup.

Figure A.7: Language Training NPVs

Panel A: DMs Distribution
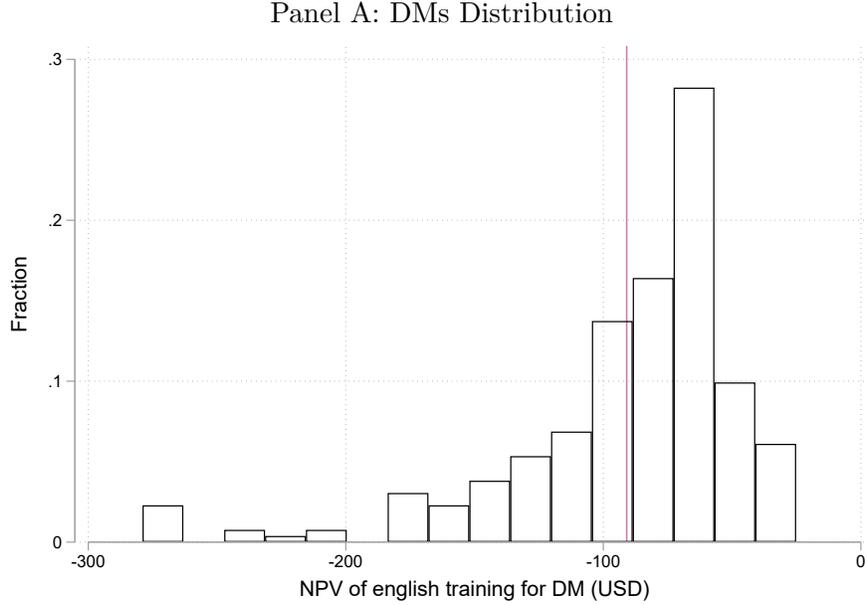
Notes: Figure plots the distribution of NPVs for the language training for each DM i: $NPV_i = \frac{1}{r}\Delta w - OC_i - C$. We set r, the monthly interest rate, to 0.8%. $w = 3.6$ is the monthly wage increase expected based on the English proficiency gained from the language training and the returns to English from resume ratings; see text. OC_i is opportunity cost of time associated with taking the 48-hour course, which we derive from the hourly wage of DM i. C is the cost of the language training (USD 300). The vertical bar is the average across all DMs.

Panel B: MNCs Distribution
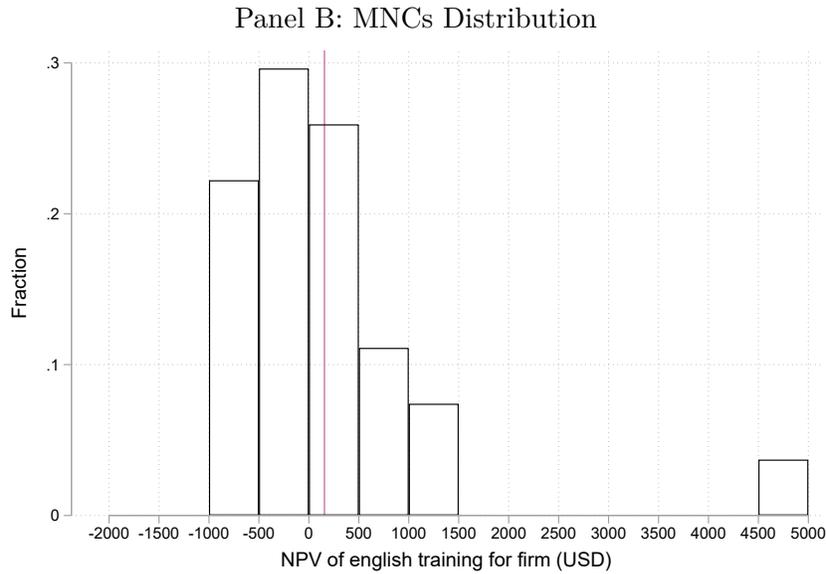
Notes: Figure plots the distribution of NPVs for the language training for each MNC f: $NPV_f = \frac{1}{r+p}(0.15 \times w_{PW,f} \times SC_{DM,f}^{0.5} - 0.19 \times w_{FM,f} \times t_{FM,f}) - C$. We set r, the monthly interest rate, to 0.8%. p is the monthly probability of the DM leaving which we set at 3% because the median tenure of DMs is two years. $w_{PW,f}$ is the average wage of production workers in firm f. $SC_{DM,f}$ is the firm-specific span of control of an average DM in terms of PWs. $w_{FM,f}$ is the average wage of FMs in firm f. t_{FM} is the average share of the FM's time spent communicating with DMs. When we do not observe one of the firm-specific variable in our data, we replace it by the average across all firms of the same country of origin. C is the cost of the language training (USD 300). The vertical bar is the average across all firms.