Language Barriers in Multinationals and Knowledge Transfers*

Louise Guillouët*, Amit K. Khandelwal†, Rocco Macchiavello‡, Madhav Malhotra*, and Matthieu Teachout§

*Columbia University, †Yale University & NBER, ‡LSE, §Pôle emploi

February 2024

Abstract

We study communication frictions within multinationals (MNCs), hypothesizing that language barriers reduce management knowledge transfers within the organization. A distinct feature of such MNCs is a three-tier hierarchy: foreign managers (FMs) supervise domestic managers (DMs) who supervise production workers. Tailored surveys from our setting – MNCs in Myanmar – reveal that language barriers impede interactions between FMs and DMs. A first experimental protocol offers DMs free English courses and confirms that lowering communications costs increases their interactions with FMs. A second experimental protocol that asks human-resource managers at domestic firms to rate hypothetical resumes reveals that multinational experience and, specifically, DM-FM interactions are valued in the domestic labor market. Together, these results suggest that reducing language barriers can improve transfers of management knowledge, an interpretation supported by improvements in soft skills among treatment

*This project would not have been possible without the support and collaboration of U Set Aung, Thilawa SEZ Management Committee, participating factories, and Ian Porter. Our project managers, Paing Thu Htet, Mohak Mangal and Sanghyun Park, have provided exceptional research support, as has the entire Yangon team: Aung Thet Paing, La Min Eain, Myat Mo Phu, Thura Aung, and Zimbo Htike. Charles Angelucci, Pol Antràs, David Atkin, Oriana Bandiera, Wouter Dessein, Ben Faber, Bob Gibbons, Isabela Manelici, Andrea Prat, Andrés Rodríguez-Clare, Raffaella Sadun, Meredith Startz, John Van Reenen, Jose Vasquez provided helpful comments at various stages of the project. We also thank conference and seminar participants at 2022 ASSA, Berkeley, Boston University, Cambridge, CEU, Census, CEPR, Copenhagen, Dartmouth, 2022 EOS-Namur Conference, 2020 Empirical Management Conference, EBRD, EIIT, Geneva, Harvard-MIT Development Seminar, HBS EM, HBS Strategy, IADB, IPA, IMF, LSE, Maryland, MIT Org. Econ. Seminar, 2020 NEUDC, Princeton, PSE, PSU, Sussex, Syracuse, Tufts, USC, Virginia, and Yale. The project is registered at the AEA RCT Registry 0004326. We obtained approval from the Columbia University IRB under protocols AAAR2302 and AAAS3817. Financial support from the International Growth Center, Jerome A. Chazen Institute for Global Business, and Columbia's Center on Japanese Economy and Business is gratefully acknowledged. The conclusions of this paper do not reflect the opinions or views of the Organisation for Economic Co-operation and Development, or of its Member countries. All errors are our own.

DMs in the first experiment. A model in which communication within MNCs is non-contractible – a realistic feature of workplace life – reveals that the experimental results are consistent with underinvestment in language training and provide a rationale for policy intervention.

Keywords: FDI, Multinationals, Knowledge Transfers, Language Barriers, Management

JEL Codes: F0, F23, L20

1 Introduction

It is well-established that management practices are an important determinant of firm performance. Firms in developing countries feature significantly lower and more dispersed management practices (Bloom et al. 2016). Identifying constraints to the diffusion of best practices to developing countries is, therefore, both a research and policy priority. Multinational corporations (MNCs) are organizations with high levels of productivity and management practices relative to domestic companies (Helpman et al. 2004, Bloom and Van Reenen 2007, Alfaro-Urena et al. 2022) and, thus, an ideal lab to study the diffusion of management knowledge and its constraints in less developed countries.

We focus on communication–specifically, language barriers–as a constraint to the implementation and diffusion of best management practices. Our focus is motivated by the observation that management knowledge is tacit, non-routine and thus difficult to codify (Polanyi 1966, Gibbons and Henderson 2012). Communication is likely a key factor enabling the diffusion of best practices, consistent with findings from a wave of recent papers in organizational economics. For instance, Sandvik et al. (2020) find high returns to improving information flows within an organization on the diffusion of best practices and productivity. Giorcelli (2019) and Giorcelli and Li (2021) document cases in which interactions of managers proved essential to the diffusion of management knowledge from an advanced country to a less advanced one. MNCs are a particularly well-suited setting to examine communication constraints. MNCs organize production through the interactions of a global workforce of employees from different nationalities and languages; it is therefore natural to expect that communication challenges could affect the performance of teams (Garicano and Rossi-Hansberg, 2015). One way to reduce these communication challenges with the MNC's headquarter is to have experienced foreign managers (FMs) to lead the local affiliate (Antràs et al., 2008). But, since FMs hire domestic middle managers (DMs) to supervise domestic production workers, this common organizational structure simply pushes inherent challenges to the subsidiary. Language barriers between FMs and DMs could limit their interactions, potentially hindering the implementation of management practices and operational performance. For instance, interviews with Chinese FMs leading Foxconn's operations in India reveal exactly the kind of challenges language barriers pose in day-to-day operations (Rest of World, 2023).

Consistent with this hypothesis, Figure 1 documents a negative correlation between manage-

ment scores of MNC subsidiaries in developing countries and language barriers with the origin country of their headquarters. The sample comprises the MNC subsidiaries surveyed by the World Management Survey. We use a gravity specification that correlates their management score with a common language indicator with the origin of the subsidiary's owner, controlling for host and origin fixed effects, distance and establishment size (number of employees).[1] While there is no relationship for subsidiaries in high-income countries, subsidiaries in middle- and low-income countries have lower management scores when the language barrier with the MNC's origin country is higher. If this correlation was the result of a causal link, language barriers could impede beneficial knowledge transfers from the MNC to the employees of the host country.[2]

Using a combination of RCTs and original surveys, this paper provides field evidence that language barriers hinder transfer of knowledge of management practices within MNCs. In our setting – MNCs operating in Myanmar – communication between domestic and foreign managers occurs in English, a non-native language for both layers.[3] We test the hypothesis that language barriers stifle interactions between DMs and FMs, and that these frictions impede knowledge transfers from the experienced FMs to the less-experienced DMs. We establish that language barriers impede communication and knowledge transfers in four steps.

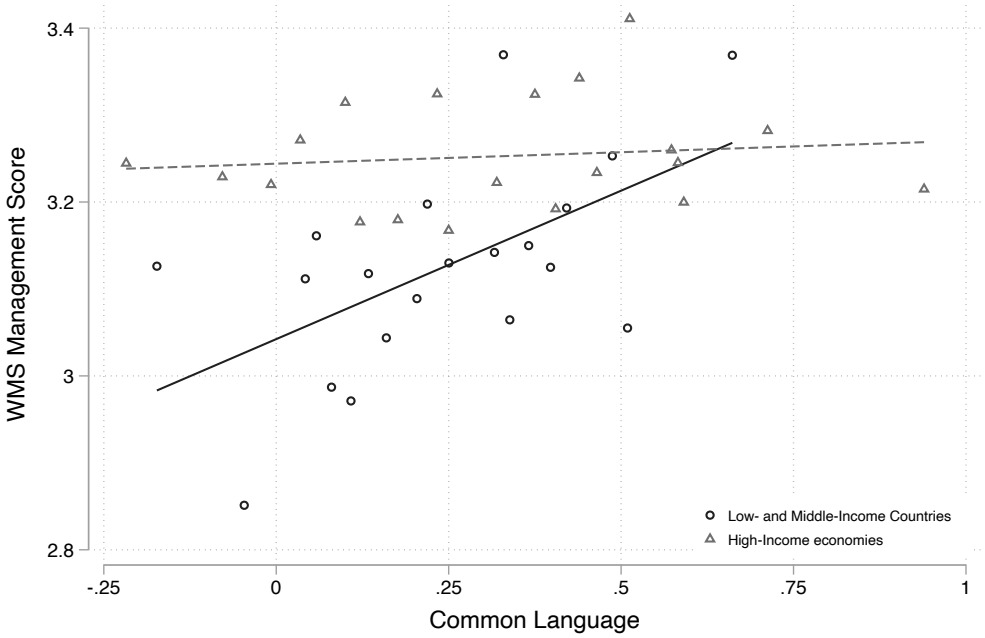
First, Section 2 exploits survey data to present evidence on the interactions between DMs and FMs within MNCs. The subsidiaries in our sample are, indeed, organized in a three-tier hierarchy, with DMs sitting between the FMs and production workers. They perform a wide range of standard middle-management tasks such as running daily meetings with production leaders, handling human resource issues, interacting with vendors on purchase orders, coordinating across departments, and so forth. Survey evidence reveals that DMs choose to work at MNCs in order to learn management skills, and they spend on average an hour a day interacting with FMs (either in individual or group

[1] The regression is $score_f = \alpha_o + \alpha_d + \beta_1 comlang_{od} + \beta_2 \ln dist_{od} + \beta_3 GMT_{od} + \beta_4 Colony_{od} + \beta_5 \ln employees_f + \epsilon_f$, where f is a MNC subsidiary in country d with ownership from country o, $score_f$ is the establishment's management score, and $employees_f$ is the number of employees. These variables come from the World Management Survey. The gravity variables are taken from the CEPII database (V202211): $dist_{od}$ is the population-weighted distance in 2018, $comlang_{od}$ is an indicator if a language is spoken by at least 9% of the population in both countries, GMT_{od} is the difference in time zone, and $Colony_{od}$ is an indicator of a colonial relationship.

[2] The figure is consistent with research that has examined drivers of foreign investment across countries, finding that forms of cultural distance – and language in particular – influence cross-border investment flows (Rauch and Trindade 2002, Blonigen and Piger 2014, Burchardi et al. 2019). More generally, it is suggestive that language barriers could limit a country's absorptive capacity (Cohen and Levinthal 1990, Keller 1996, Borensztein et al. 1998).

[3] English knowledge in Myanmar is generally low, but not an outlier among regional and income-level peers. In the EF English Proficiency Index, Myanmar ranks similar to Jordan and Mexico, and is 29th out of 41 among low- and lower-middle income countries (EPI 2020).

Figure 1: Management Practices and Language Barriers in World Management Survey



Notes: Figure reports the binscatter of the regressions in Footnote 1. It plots subsidiaries' management score against a common language indicator, controlling for distance, difference in time zone, colonial relationship, establishment size, and host and source country fixed effects. The grey triangles are from the regression using subsidiaries in high-income countries, and the black circle is using the sample of subsidiaries in low- and middle-income countries (according to the World Bank).

meetings). However, English tests (and anecdotes) reveal that average DMs' English proficiency is low and communication between FMs and DMs is frequently "lost in translation." DMs with better English skills communicate more with FMs, are more involved in managing the organization, and earn higher wages. These stylized facts are consistent with communication being important for potential transfers of management knowledge.

These correlations are, however, only suggestive. Setting aside standard endogeneity concerns, it is not obvious that FM-DM communication would improve if language barriers were lowered. Language barriers might not be binding if companies employ translators, use technology (e.g., Google Translate), or hire bilingual DMs to sidestep language problems. Additionally, DMs and FMs might be unaware of the benefits of improved communication. Moreover, lower communication costs have both substitution (the FM interacts more with the DM when it is less costly to do so) and income effects (the FM has to interact less with the DM to transmit the same amount of instructions). They could lead to higher specialization and lower autonomy of subordinates (see Dessein and Santos 2006, Bloom et al. 2014), thereby limiting the opportunity for knowledge

transfers. Finally, FM's communication is unlikely to be aligned with DMs' desired one: the FM wants to communicate knowledge that is specific to the functioning of the firm, while DMs presumably want to acquire general knowledge. Thus, there is no guarantee that reducing language barriers would increase communication and the transmission of general knowledge.

In the second step – Section 3 – we therefore implement a randomized controlled trial to test the hypothesis that reducing language barriers between DMs and FMs increases communication. We contracted with a 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. At endline, treated DMs' English skills, as measured by an English test, improve relative to control. Treatment DMs also report having more frequent communication and interactions with FMs (but not with other DMs). Because of the large range in DMs tasks and firms' sectors, we cannot directly measure DMs' interactions and performance in the field. Instead, we probe these mechanisms through a standardized management exercise that simulates the organizational structure of the 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 instructions to 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. Treatment DMs spend 19% more time communicating with the "FM", consistent with their higher English proficiency relative to control DMs. Additionally, this confirms that reducing language barriers increases communication, but at a time (or effort) cost for FMs. Reassuringly, treatment DMs also supervise the completion of the packaging tasks faster than control DMs (with no differences in mistakes). We complement these findings with a second approach that directly checks whether communication with FMs impacts skills learned on the job. We implement a long-run follow-up survey tracking skills and labor market opportunities among the DMs from the language experiment more than a year after the intervention. Treatment DMs report learning more soft skills (e.g., problem solving, negotiation, confidence, professionalism and customer relations) during their tenure at the company compared to control DMs. Additionally, although there is no differential exit or salary growth, treatment DMs report applying to more jobs than control DMs. Taken together, the pre-experiment surveys, experimental protocol, and the long-run follow-up survey support the conjecture that DM language barriers impede communications with FMs, and that removing them could increase management

knowledge transfers valued by the domestic market.[4]

Third, Section 4 demonstrates that the communication between DMs and FMs is, in fact, valued by the domestic labor market. We recruit a sample of 51 human-resource managers who work at domestic firms to rate hypothetical resumes (and, later, interview answers) in which we randomly vary the characteristics (and answers) of job applicants for a general management position. In the first block, we find that HR managers place a 10.2% wage premium on applicants with MNC experience, and further value applicants with both MNC experience and advanced English proficiency. While these results are reassuring, both the MNC experience and English proficiency could proxy for unobserved traits or skills rather than our communication hypothesis. We therefore test the hypothesis that frequent communication with FMs is specifically valued through a second rating block. Building on the resume rating in the first block, HR managers are then asked to assess answers to hypothetical questions that could arise during an interview. 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). We find that applicants with frequent interactions with FMs are offered a 9.9% wage premium, as high as those offered to applicants with the hard skill. We mitigate a selection mechanism through a third response in which the applicant reports being hired to interact frequently with the FM but could not do so for exogenous reasons. These results suggest that the domestic labor market values management knowledge learned at MNCs, and specifically DMs' interactions with foreign managers.

Section 5 clarifies the potential sources of under-investment in language training for both DMs and firms. Building on the results, we assume that a DM learns general management skills through on-the-job communication with a FM. In competitive markets, it is thus not surprising that employers would not invest in general training due to a standard hold-up argument (Becker 1962). Employees might, of course, invest in such general skills, unless credit constraints (Attanasio and Kaufmann 2009, Kaufmann 2014) and/or behavioral biases (Karlan et al. 2014) prevent them from

[4]The null effect on differential impacts on exit and salary changes may be because both events are somewhat rare phenomena that make it difficult to detect given the sample size. For example, using administrative data from Costa Rica, Alfaro-Urena et al. (2019) indicate that over a two-year period, approximately 13% of employees at MNC affiliates leave their job for another MNC or domestic company. Adhvaryu et al. (2022) find that training employees can lead to increases in productivity without changes in salary. Finally, the skills acquisition and realized labor market outcomes may have been dampened by two large negative shocks that coincided with the study period: the pandemic (which severely limited face-to-face interactions between FMs and DMs) and the February 2021 military coup (which increased uncertainty, diverted attention from day-to-day operations, and curbed labor market opportunities).

doing so. Here, we emphasize a novel organizational friction that could also contribute to under-investment in language training. Organizational economists have long argued that the amount, and content, of communication within firms is non-contractible (e.g., Crawford and Sobel 1982, Dessein 2002 and Dewatripont and Tirole 2005). This within-MNC contractual friction, which we take to be a realistic feature of the workplace and for which we also provide supporting evidence, implies that – holding DM's language skill constant – FMs suboptimally communicate because they do not take into account DM's learning opportunities. If DM's language skill is complementary with FM's communication, as supported by the results from the language experiment, DMs will under-invest in acquiring language skill. There is thus an inefficiency and, potentially, scope for policy intervention. While policies cannot directly address the non-contractible nature of communication, under certain conditions, a subsidy for language acquisition might move the equilibrium closer to the efficient outcome.

In addition to providing the first experimental exploration of the importance of language barriers within MNCs, our results connect two separate strands of the literature: on multinationals and on management in developing countries. Multinationals are more productive and have superior management practices than domestic firms and drive a large share of world trade.[5] The 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, our model focuses 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. Debaere et al. (2013) study the role of language in shaping multinationals' boundaries using data

[5] See Helpman et al. (2004), Bloom et al. (2012b) and Antràs and Yeaple (2014). A large literature examines the consequences of FDI on developing countries, for example through supply-chain linkages; e.g., Aitken and Harrison (1999), Javorcik (2004), and Alfaro-Urena et al. (2022); see also the survey by Harrison and Rodriguez-Clare (2010).

[6] For evidence that contracting problems and informational barriers constrain production and trade, see Macchiavello and Morjaria 2015, Atkin et al. 2017, Bai et al. 2020, Chen and Wu 2021, Startz 2021, and Atkin and Khandelwal (2020) and Macchiavello (2022) for reviews.

from South Korea.[7] While we focus on a specific barrier that impedes the transfer of management knowledge, Burstein and Monge-Naranjo (2009) show that reallocating management know-how from developed to developing countries can have large aggregate impacts. More broadly, we provide microeconomic insights into an older literature about the critical role that a country's "absorptive capacity" (Cohen and Levinthal 1990) plays in its ability to acquire knowledge transfers from advanced FDI. For example, Borensztein et al. (1998) shows that FDI leads to higher growth only when the host country has a minimum threshold stock of human capital. This paper unpacks what is plausibly one of the most important drivers of a country's "absorptive capacity".

Our results connect the internal organization of MNCs with the literature on diffusion of management practices. The literature has shown that firm performance correlates with the quality of management practices and, consequently, many studies evaluate training programs aimed at improving those practices (see, e.g., Bloom et al. 2012a and McKenzie and Woodruff 2014) or mid-level managers and workers' skills (Macchiavello et al. 2015, Adhvaryu et al. 2022). At the same time, it has been noted that management practices diffuse slowly (Gibbons and Henderson 2012, Bloom et al. 2016, Bloom et al. 2020). Lack of awareness of certain management practices could explain limited diffusion (Bloom et al. 2012a) but, since MNCs tend to be well-managed to begin with, lack of awareness is unlikely to be a major constraint to the diffusion of good management practices within MNCs. Adequate communication flows, on the other hand, have been shown to be essential for productivity and for the adoption of good practices. For example, Giorcelli and Li (2021) describe challenges with Soviet managers unable to communicate with Chinese managers and develop an identification strategy to study technology transfers by exploiting unexpected delays to 156 Soviet-led projects in China. They argue that project delays were caused by language barriers and miscommunication at the project sites because of shortages in the supply of translators. Battiston et al. (2021) demonstrates the importance of face-to-face communication for the transmission of information flows across co-workers within an organization while Atkin et al. (2022) identify the importance of face-to-face, serendipitous, interactions for innovation. Sandvik et al. (2020) run an experiment that encourages communication and information sharing amongst sales managers and finds large productivity gains. These contributions demonstrate the importance of

[7] Khanna et al. (2011) describe Samsung's effort to increase language understanding within the multinational. Reducing language barriers is at the core of costly company's choices to switch to a lingua franca – exemplified in the cases of high-profile Japanese companies adopting English (Rakuten and, more recently, Honda; see Kubota 2015).

face-to-face communication flows that could be impeded by the language barriers studied here. Espinosa and Stanton (2022) evaluates a training program that improves skills of frontline workers in a Colombian government agency. Consistent with the implications of a model of knowledge hierarchies à la Garicano (2000), workers armed with the newly acquired skills needed less help and thus communicated *less* with their line managers, enabling those to focus on higher-value tasks. In our case, the training improved DMs' language skills, leading to *more* communication with FMs.[8]

2 Evidence for Communication Frictions

This section describes the setting and provides evidence on interactions between FMs and DMs.

2.1 Setting

Following the 1962 military coup, 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. According to data from the Myanmar Directorate of Investment and Company Administration, those reforms were successful and average annual FDI inflows between 2010 and 2020 were $5 billion compared to $1.6 billion in the previous two decades, with roughly 90% of flows originating from East and South-East Asia.

The 2014 Special Economic Zone (SEZ) Law was a key component of the economic reforms and 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 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). Japanese MNCs are the largest investors, followed by Singaporean, Thai, Chinese, European/American, and Korean MNCs. The affiliates span a range of sectors, including

[8] Other related studies include Abebe et al. (2019) on how young middle managers learn management skills by interacting with experienced managers, Cai and Szeidl (2017) on how business meetings improve firm performance in China, Bianchi and Giorcelli (2022) and Bai et al. (2021) on how supplier networks and labor mobility fostered knowledge spillovers, Bisztray et al. (2018) on knowledge spillovers in importing along managerial networks, and Gupta et al. (2022) on how language barriers hinder technology adoption in agriculture in India.

chemicals, distribution, electronics, garments, logistics, machinery, and metals; see Figure C.1.

2.2 Timeline

Our data come from worker and firm surveys conducted between Summer 2018 and Fall 2021. In 2018, we conducted a survey of 400 domestic managers (DMs) at 30 MNCs. 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 earning over $200/month, the income-tax reporting threshold in Myanmar, is a plausible objective metric to identify DMs at each company.

This survey was specifically designed to assess DMs' language proficiency in English and in the original foreign language of the company, and to learn about DMs' communication and interactions with FMs. We simultaneously conducted a survey by asking the HR managers at the company to report FMs' language skills and learning frictions.

In January 2019, we designed the language experiment protocol and recruited 27 MNCs to participate.[9] 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.[10] 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 the resume rating exercise. Finally, in January 2021, we began a survey to measure DMs' skills learned at the MNCs. 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 in October 2021.

[9] The 30 firms who agreed to participate had on average 141.4 employees. The 15 other firms operating at that time who did not participate were smaller, with on average 60.1 employees. Of 30 firms who participated in pilot surveys, three firms did not participate in the language experiment: a large Chinese MNC who uses Mandarin as lingua franca and did not value English training, and two Japanese firms.

[10] 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.

2.3 Motivating Facts

The 2018 survey reveals five motivating facts about MNC organizational structures, language barriers, communication and learning that informed the experimental designs and model.

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 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

Pilot surveys elicited why DMs chose to work at MNCs. Panel A of Figure C.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% of DMs, 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).

What are these management skills? Given the range of tasks that DMs perform, it is difficult to identify precise skills. But, their job descriptions 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. Two thirds manage direct subordinates, while the

rest of them focus on more technical tasks such as accounting or finance. Regardless of the job specifics, interactions appear to be an important component of DMs' 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 employees in North America, Europe and the Middle East spend in meetings in a typical day according to DeFilippis et al. (2020). They report spending, on average, about 1.1 hours per day interacting with FMs (either in meetings or individual conversations).

Fact 3: DMs English Language Proficiency is Low

Communication between FMs and DMs occurs in English, which is neither group's native language. Despite being more educated than production workers and probably selected, in part, to communicate with FMs, 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 3 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 2 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 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 designed a language test that we administered on our own to the full sample of DMs and a 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 anonymously and independently scored by the two consultants. On the subset of DMs who took both the language provider's test and our test, Figure C.3 indicates a positive correlation between the two, suggesting that our test is effective in

assessing language proficiency and was more practical to implement as part of a survey.

Panel B of Figure 2 reports the distribution of test scores among the DMs and FMs at baseline. English proficiency among DMs is on average lower than FMs: the average FM score is about one standard deviation above the average DM score. As mentioned above, we had difficulty securing time to administer the English test to FMs. However, during the Summer 2018 survey, companies' 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" (C Level on the CEFR scale) 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 C.4 reports these distributions; virtually none of the FMs know Burmese and very few DMs are proficient in the FMs' language.

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).

Translation services can overcome language barriers, and survey evidence reveals that average comprehension among DMs rises to 84.0% when a translator is present. However, only half of the firms in our sample hire translators. This does not mean that language barriers are unimportant. Instead, two factors limit the pervasive use of translators. First, translators are expensive. Part-time translators cost approximately \$100 a day, well above the average daily DM wage of \$15.7. Second, translators are an inefficient technology; meetings with translators can only cover half the content because of the time to translate in both directions. As a result, firms that use translators hire them on a casual basis for, on average, 1.5 hours per day, and the translator typically follows the FMs, not the DMs. So, if the company hired one translator per FM, the typical firm would spend an additional $4.5 \times \$100 = \$450$ per day on wages for translators, a substantial increase relative

to the $13.3 \times \$15.7 = \$209$ daily wage bill for DMs; even if the wage for a full-time translator was halved, it would still double the wage bill for employees in this middle layer. Furthermore, the firm would choose a level of translation services to maximize firm profits and not account for potential learning spillovers to the DMs.

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

- 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 Language Barriers Correlate with More DM-FM communication

Lower language barriers 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 education, age, tenure, work experience, Big 5 personality score and Raven test score. Standard errors are clustered at the department level, the set of which are general management, accounting and finance, human resource, logistics, production, engineering, research and development, marketing. We consider five outcomes: wages, the score on questions of management practices adapted from the US Census of Management and Organizational Practices Survey (MOPS, scale 1-15) in Bloom et al. (2019), self-reported involvement in plant operations (scale 1-4)[11], frequency of FM communication (scale 1-4), and directly report to an FM (0/1). An important caveat to the management questions is that they are developed to measure practices at the *firm* level, while we measure differences across managers *within* firms.

Table 2 reports the results. A one standard deviation increase in the English score is correlated with a 0.21 higher log wage, a 0.24 higher management score, 0.18 more involvement, 0.15 higher frequency of communication, and a 0.09 higher likelihood of directly reporting to an FM.

Of course, the coefficient on English 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 explore DMs' communication across *two* different superiors: their FM (who is either their direct boss or their closest FM at the firm) and a domestic manager.[12] This allows us to compare interactions with each superior while controlling for a DM fixed effect through the following specification:

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

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 100% since two individuals

[11] 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 make the final decision".

[12] 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.

would be speaking in Burmese. The results 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 one standard deviation is correlated with a 0.20 more frequent communications with the FM, and a 10.9 percentage points decrease in time lost.

These facts are consistent with communication between the top two layers being important for potential transfers of tacit and hard-to-codify management knowledge. However, the correlations are only suggestive. First, although we control for several observable characteristics, the partial correlations presented here could be due to omitted variables or selection rather than demonstrating an impact of lower language barriers on communication. Furthermore, it is not obvious that communication between FMs and DMs would improve if barriers were lowered. Companies already use translators, technology (like Google Translate), or could hire bilingual DMs to sidestep language problems. Moreover, the fact that not all firms use these strategies suggests that language barriers may not be binding. Additionally, DMs and FMs might be unaware of the benefits of improved communication. Third, lowering language barriers will have both substitution and income effects that lead to opposing impacts on communication. Improving English could lead FMs to interact more with a DMs since is less costly to do so, or could reduce interactions since the FM could transmit the same amount of instructions in less time. In some models of organizations, lower communication costs lead to higher specialization and lower autonomy of subordinates (see Dessein and Santos 2006 or Bloom et al. 2014), thus limiting the opportunity for knowledge transfers through direct interactions. Finally, FM's communication is unlikely to be aligned with DMs' desired one. The FM wants to communicate knowledge that is specific to the functioning of the firm. Instead, the DMs want to acquire knowledge that is general, as they indicate in the pilot surveys. These observations motivate the two experimental protocols in Section 3 and 4.

3 Language Barriers and Communication with FMs

This section presents the design and the results of a randomized controlled trial which allows us to measure the effect of reducing language barriers on communication between FMs and DMs.

3.1 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.[13]

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.[14] The sessions took place after working hours and on weekends, and we offered DMs the option to take the course either at a rented space near the SEZ or at the company's main office in downtown Yangon. The provider's standard procedure is to conduct an initial English assessment to determine the DM's knowledge (see Figure 2, 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.

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 a management simulation exercise. The goal of the management simulation

[13] We excluded Myanmar employees earning above the salary threshold if they held a technical occupation (e.g., engineer or production technician), and brought into the sample frame 64 DMs below the salary threshold at the request of 18 firms. For the 64 DMs below the cutoff, the average wage is $157. These managers are, on average, 5 years younger than the above-threshold DMs, so it is possible that they were selected based on their future potential. However, in half of the MNCs that included below-threshold DMs, the average wage of the included DMs was around $187 ; so, for these firms, it could have been that the company just thought they were "close enough" to the threshold. The 18 companies also appear to pay lower wages, on average; their above-threshold DMs earn about 13% lower wages than the companies who did not include below-threshold DMs.

[14] 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.

exercise was to check that improved language skills could potentially translate into better communication within the context of a three-tier organizational structure of MNCs. Since we are interested in middle management, we wanted to check that the improved language skills allow *both* for better comprehension of instructions from FMs *and* better transmission of information to subordinates. An enumerator with advanced English proficiency acted 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 C.2). 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 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 required a physical presence. Finally, as mentioned above, we conducted a longer-run follow-up survey to assess knowledge transfers.

3.2 Baseline Statistics and Empirical Specifications

Table C.1 reports baseline balance between the treatment and control individuals, after controlling for strata fixed effects. The average age is 28.2 years with a tenure of 1.3 years. The average DM tenure is low because the firms began operations after the opening of the SEZ in 2015. In the control group, 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 communication frequency is marginally significantly different when comparing the treatment and control group, with treatment individuals talking 0.18 units less (on a 1-4 scale). The final row of Table C.1 reports attrition at endline: 12% of control DMs refused the endline survey, an attrition rate which is only marginally different between treatment and control group.

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

$$y_i = \alpha_0 + \alpha_f + \beta treat_i + \gamma y_{0i} + \phi mode_i + \epsilon_i \tag{3}$$

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.[15] 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 firm-department, which allows for correlations among DMs within, for example, the production department at company A or human resources at company A. There are 76 firm-department clusters.

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

$$y_i = \alpha_0 + \alpha_f + \beta takeup_i + \gamma y_{0i} + \phi mode_i + \epsilon_i \tag{4}$$

where $takeup_i$ is a continuous value between 0 and 1 based on the number of sessions attended instrumented with random treatment assignment.

[15] For outcome variables that are noisy and with low autocorrelation, such as those that we focus on, averaging over multiple measurements taken at relatively short intervals allows one to reduce noise and increase power (McKenzie (2012)). For dropouts and non-takeup treatment DMs, we assign their survey schedule corresponding to their cohort's survey schedule. 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).

3.3 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.

Takeup and English Proficiency

Table 3 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: DMs attend, on average, 56% of the course. We use the continuous takeup measure in the TOT specifications.[16]

We measure the impact of the language course on DMs' English proficiency at endline using our tailored test (using questions that differed from the baseline). Column 3 reports the impact of being assigned to treatment on English test scores: $0.15sd$. The TOT specification in column 4 shows a larger effect: $0.26sd$. The remaining columns separate the effects on speaking (columns 5-6) and listening comprehension (columns 7-8).[17] Thus, the training appears to have successfully improved the English proficiency for treatment DMs.[18]

Communication

The goal of this RCT is to measure the exogenous impact of improved English (reduced language barriers) on communication. Table 4 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

[16] Figure C.5 shows the attendance distribution. The 76% initial-class attendance rate exceeds the average 65% initial-class attendance rate for training programs reviewed by McKenzie and Woodruff (2014).

[17] The overall English scores in columns 3-4 are the average of the speaking and listening scores. The number of observations for the speaking scores is lower because at baseline, the quality of the recording for 24 DMs was poor and the external graders could not assign a score; missing values are not statistically different between treatment and control (p-value of 0.55) and for these cases, the overall English test score is just the listening score, instead of the average of listening and speaking.

[18] There are few papers studying language training among adult. Hoya et al. (2018) measure the impact of a 66-hour course over 11 weeks teaching English as a second language to adults living in the UK and find an improvement of about 0.33 for treated individuals relative to control individuals. The larger effect compared to our intervention could be driven by setting, as residents in the UK would have substantially more opportunities to practice English outside the workplace.

value of 2.31 (on a 1-4 scale), and the TOT coefficient is 0.33. This translates to roughly 34 more minutes in the last week for the ITT specification and 56 minutes in the TOT specification.[19] 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: the results may 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. If a DM's direct boss was a foreign expat, we would ask the respondent to identify also one Myanmar manager (either a boss or someone at their level in the hierarchy). Treated DMs do not report talking more frequently with their domestic bosses/colleagues. They report attending meetings with a fellow DM 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 overall.[20]

Management Simulation

Table 5 reports the results of the management simulation. 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 minutes, a 15% improvement in productivity. The TOT is 0.37 minutes faster. However,

[19] Throughout the data collection, we record the frequency of communication with an FM in the previous week on a scale from 1-4. In the 2021 longer-run survey, we also ask the respondent about the total time communicating with the FM in the previous week. We regress the continuous time measure on our discrete scale of 1-4 to translate the talk frequency measure into minutes. At endline 40 DMs report not having a direct boss, so the talk frequency (columns 1-2) and time lost questions (columns 5-6) are not applicable to these DMs. A regression of "not having a direct boss" on treatment reveals no difference between treatment status (coefficient -0.04 with standard error 0.03).

[20] We provide further evidence of the complementarity between language ability and communication between DMs and FMs in Appendix B. Panel A of Appendix Table B.1 shows that treated individuals are willing to pay more than the control group to spend an hour communicating "one-on-one" with their FMs.

despite this shorter time, mistakes were no different between treatment and control (columns 3-4), so quality-adjusted productivity improved.

Why did performance improve for treatment DMs? Columns 5-6 offer a mechanism. We find that treatment DMs spend more time talking with the "FMs". 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 that 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". Lowering language barriers increases communication with the FM which, in turn, likely allows treated DMs to impart clearer instructions to their team, thereby speeding up production. At the same time, the more time spent answering questions is a cost for the FMs, and plays a central role in the theoretical model discussed below.

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 5.[21]

3.4 (No) Spillovers 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 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 (production, HR, logistics, etc.) 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,

[21] It is possible that treatment DMs improved their English, for instance, through English books, social media, or television, but we find no evidence for this; see Table C.3.

with typically at most one FM 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 potential for spillovers by running the following specification on control DMs that relates their outcomes to the intensity of treatment DM in their department:

$$y_i = \alpha_f + \beta FractionTreated_{fd} + \epsilon_i \tag{5}$$

where $FractionTreated_{fd}$ is the share of treated DMs working in department d at company f. As in the previous specifications we control for strata (firm) fixed effects α_f. Table C.4 shows results for the main outcome variables: English knowledge, communication, involvement, and management simulation. Overall, we are unable to detect effects along most of these outcomes, that is suggestive of no spillovers to control DMs.

3.5 Skills Learned from Language Experiment

We find no evidence of treatment effects on management practices adapted from the US Census of Management and Organizational Practices Survey (see Panel B of Appendix Table B.1). It is possible that it either the English training was not able to sufficiently improve the transmission or that firms anticipate the returns to transmitting these practices are low and thus FMs do not prioritize teaching these practices in the increased communication with DMs. However, we do find treatment effects of increased involvement in the management of personnel. This motivated a long-run survey more than a year after the experiment, to capture the specific skills learned by DMs alongside, actual labor market outcomes.

Our ability to survey the sample through long-run followups was complicated by two large shocks that coincided with the period of study: the Covid-19 pandemic and the military coup. In addition to limiting our ability to conduct detailed interviews about the set of skills learned (and how to quantify them), both shocks may have slowed the knowledge transfers, as interactions between FMs and DMs fell substantially due to lockdowns, and the uncertainty brought about by the coup diverted attention away from day-to-day firm's operations. Nevertheless, we provide some evidence of differences in skills acquired. Interviews with treated DMs provide anecdotes highlighting both their diversity but also their general nature:

- 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."*

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. The attrition for treatment is 23.4% and for control is 29.9% and the 6.5 percentage point difference is not statistically significant (p-value 0.26).

The survey was designed so that DMs would choose from 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 firm-department, as before). Panel A of Table 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 skills, 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 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). Alternatively, it could imply that the returns to the organization of teaching these skills is low, that FMs find these more difficult to teach, or that the improved language skills are not sufficient to transmit them.

We also tracked 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 6 reports the results.[22] Treatment DMs do not report higher salaries (columns 1-2) nor are they more likely to have left the company (columns 3-4). In addition to the two labor market shocks during this period (the Covid-19 pandemic and the military coup), switching MNC jobs and salary changes may be difficult to detect given our sample size. Alfaro-Urena et al. (2019) indicate that over a two-year period, approximately 13% of employees at MNC affiliates in Costa Rica leave their job for another either another MNC or domestic company. Adhvaryu et al. (2022) find that training employees can lead to increases in productivity without changes in salary.

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 one year after the treatment.

4 Communication and Knowledge Transfers

In this section, we examine whether communication with FMs are valued in the domestic labor market, to provide further support for knowledge transfers.

[22] The regressions follow the approach in (3) and (4) by averaging outcomes collected at the endline and post-endline follow-up, control for baseline wage, include strata fixed effects.

4.1 Resume Ratings Protocol

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. We rule out HR managers working at other MNCs, to mute the relevance of English language skills as the driving force for the demand for workers with MNC experience. The recruitment occurred through an online job platform. In the ad, we explained that we were seeking HR managers with at least 2 years of work experience to review resumes for management positions. The service was presented as a consulting opportunity that paid $20 for about 1-2 hours of work. 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. Table C.5 reports the demographics of the HR managers. As their primary role at their companies is to recruit personnel, the typical manager reports screening 523 resumes (typically 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 7.0 years of work experience (of which 1.7 at a MNC). The HR managers report an average 24% of applicants for jobs at their domestic companies come from individuals with prior experience working at FDI company.

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 below). 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 discussing the results and their relationship to existing findings from the literature.

We implement two blocks of the resume rating exercise. Block 1 examines returns to MNC experience, provides a benchmark estimate to assess the validity of the approach, and allows us to

introduce the second block. Block 2 specifically tests for the mechanism we are interested in: is communication with FMs valued by potential employers in the labor market?

Block 1: Applicant Characteristics

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. They were applying for a general management position. 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. The donor pool of characteristic values, summarized in Panel A of Table C.6, was chosen to broadly reflect the demographics of the DMs from Section 3.

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).[23]

We assess the HR manager responses through the following specification:

$$y_{rc} = \alpha_r + \alpha_p + \beta_1 english_c + \beta_2 MNC_c + \beta_3 english_c * MNC_c + \sum_k \beta_k x_{kc} + \epsilon_{rc} \tag{6}$$

where y_{rc} is the outcome that HR manager r places on applicant c (e.g., the wage offer). 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, and analyze the importance of communication between the applicant and his previous foreign boss.

[23] 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).

All applicants graduated from the same university with the same degree (Bachelors in Business Administration from Yangon University), lived in Yangon, were married, male, 26 years old, 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 C.6.

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.[24] 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 they would 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.

[24] We were concerned that respondents would find this statement unusual, therefore adding noise to the outcome. 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.

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

$$y_{rc} = \alpha_r + \alpha_p + \gamma_1 freqcomm_c + \gamma_2 hardskill_c + \gamma_3 involvement_c + \epsilon_{rc} \tag{7}$$

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

Results

Block 1: Applicant Characteristics

Table 7 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 indicate that the wage premium for an applicant with advanced English proficiency is 15.9% (a $51.3 increase from a mean $323.2). More importantly, we estimate a return to MNC experience similar in magnitude: all else equal, having MNC experience would increase the wage offer by 10.2% (a $33.1 increase). This result suggests that the managerial experience gained at MNCs might be general enough to be valued by HR managers at domestic companies. Additionally, a candidate with both advanced English and MNC experience further raises the return by 3.6%, or an additional $11.5. These results are also consistent with our hypothesis that lower communication barriers increase the value of the experience earned while working in a MNC, a hypothesis central to the model in Appendix A.

Although the resume rating exercise asked about hypothetical applicants and was not incentivized, its results appear plausible. The average wage offered to DMs with no MNC experience and no English knowledge is $323.2, very much in line with those observed in our sample. 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 18.4% ($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 of 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, this range is likely to be a lower bound on the experience premium.

Column 2 of Table 7 reports the respondent's perception of how involved the candidate was in management at the previous job (1-4 scale).[25] 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, and it is statistically significant. This suggests that improving the English proficiency to advanced for an applicant with MNC experience greatly improves the perceived involvement in management. Not surprisingly, overall work experience is the largest driver of the perceived involvement of the candidate.

Column 3 of Table 7 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. The relative size of the coefficient estimated for the interaction between the two is comparable to those estimated in columns 1 and 2 but is not statistically significant at conventional levels.

Block 2: Does Communication with FMs Increase Learning?

The second block directly tests our hypothesis that frequent communication with FMs leads to valuable knowledge acquisition by the DMs. Table 8 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 were they 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

[25] 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.

did not frequently speak with their FM (a $40.8 increase over a mean of $410.2).[26] 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 24). 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 the fact that candidates were chosen to interact with the FM. We think this partially mitigates the concern that communication with FMs might serve as a signal of English language skills, beyond the stated proficiency levels, under the assumption that candidates chosen to interact with the FM might have good language skills to begin with. However, it may still be the case that communication with FMs improves English proficiency over time. That we choose HR managers only from domestic firms where English language skills are less relevant, may also help address this concern.

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 targets see a 0.84 increase in perceived learning.

Taken together, the evidence suggests that domestic employers value experience acquired by

[26] Notice that the mean wage offer in Block 2 is consistent with the estimates in Block 1. In Block 2 we told recruiters that the candidates have an Advanced English level and three years of experience in a large establishment owned by an MNC. The corresponding wage offer for this population from Block 1 is approximately $419.1.

DMs' working in MNCs, and – holding constant English proficiency – particularly those that frequently communicate with the FMs.

5 Discussion of Mechanisms and Policy Implications

The evidence in Sections 2, 3 and 4 indicate that language barriers between DMs and FMs hinder communication and knowledge transmission and that English proficiency is highly valued in the market. These findings raise a number of questions: (a) why, despite this evidence, is knowledge of English so low at baseline? (b) is the current market equilibrium inefficient? and (c) if so, which policy instruments could be used to ameliorate the market outcome? This section provides an informal discussion of these questions. The Appendix presents a formal model that informs this discussion as well as several pieces of additional evidence that support the policy implications of this study.

5.1 Why is English proficiency so low at baseline?

The evidence suggests seemingly substantial returns for DMs associated with improving English proficiency. Given this, what explains the low baseline English proficiency among the DMs?

Let's start with the MNCs. English proficiency is a general skill, and we should not expect employers to pay for it (Becker 1962): in competitive labor markets workers would be able to renegotiate their wages up to the (marginal) value generated by the training, leaving employers with no incentives to invest. In practice, search and mobility frictions imply that firms and workers bargain over the surplus created by the training in general skills. Employers might then have an incentive to pay for some general skill acquisition (see, e.g., Acemoglu and Pischke 1998). Our results seem to confirm the presence of such frictions: wages and workers' mobility did not increase despite treated DMs applying to more jobs. Furthermore, MNCs' private return might be quite substantial: even though we do not have direct evidence on firms' profits and productivity, FMs spend a substantial amount of time communicating with DMs and translators are expensive. At baseline only two firms in our sample had paid for any formal English training for their DMs. On the other hand, take-up of our intervention was extremely high, with 90 percent of firms (enthusiastically) accepting our invitation to participate, suggesting that language barriers are

indeed a significant concern in this context. The literature has documented other notable examples in which large firms under-invest in profitable training and consulting programs (e.g., see Bloom et al. 2012a or Adhvaryu et al. 2022). Several mechanisms could account for this possibility: employers might *over*-estimate the likelihood that trained DMs would leave the firm, they might *under*-estimate the returns from the training, or they might be too busy to search for and organize a training program (see, e.g., Macchiavello et al. (2015)). Although we do not have a definitive answer to this question, we conjecture that a mix of these motives might be at play.

From the workers' perspective, there appears to be a significant wage premium for English proficiency. Why do they not invest more? The literature has identified several frictions that might hinder workers' incentives and ability to invest in general skills that would be applicable in our setting, including credit constraints, behavioral biases, and information imperfections.

We have some (suggestive) evidence that DMs are, broadly speaking, aware of the market returns to English. We collected DMs' WTP for English training before the RCT. Before asking the question, we randomly revealed to a third of them (non-experimental) statistics about the market premium for English knowledge. This intervention had a small (and statistically insignificant) effect on DMs' stated WTP for the program, providing some suggestive evidence that lack of knowledge of labor market returns is unlikely to be a major barrier to investment for employees working in an MNC. Of course, this is hardly conclusive, and misperceptions of the returns to English could explain underinvestment. Furthermore, there may be other explanations at play, such as present bias or misperceiving the (non-pecuniary) costs of taking language courses.

Our search for English language training providers in Yangon yielded 34 providers, with an average cost of \$103 (sd \$205) for beginner level training, roughly under one-third of the DM monthly wage. The search revealed a very significant price dispersion (see Figure C.8). This dispersion is suggestive of a market with asymmetric information: though workers may be aware of the benefits of learning English, they might not have information about which training providers would provide good value-for-money. A market equilibrium could emerge in which many providers offer training with very uncertain (if any) benefits at a relatively low price, and only a handful of firms offer high-quality training at extremely high prices (Wolinsky 1983). Consistent with this, we find that training imparted by native speakers – and thus arguably of higher quality – are indeed very expensive. The language training we chose, taught by English native speakers, had a listed

price of $1184, roughly three months of a DM's wage. Although there are inexpensive English training programs in Yangon, high-quality English courses taught by English native speakers are expensive and, therefore, credit constraints are a plausible constraint in our context. It is worth noting that to implement our study, we were able to negotiate a bulk discount with the English provider that lowered the cost to $300 per attendant.[27]

5.2 Is the current market equilibrium inefficient?

Theoretical Argument

The arguments above suggest that the baseline level of investment in English proficiency might be inefficient due to several market imperfections well-studied in the existing literature on training for general skills. In the Appendix, we put forward a simple theoretical framework that uncovers a further, novel, source of inefficiency. In the model, a DM (he) learns general management by communicating with an FM (she), as demonstrated in Section 4. To communicate with and to learn from the FM, he must acquire some language ability (e.g., English). We assume that language ability is complementary with the FM's communication effort, as suggested in Section 3. The model sets aside the barriers discussed in the previous subsection and instead focuses on a new source of inefficiency motivated by the organizational environment we study: communication within the MNC is *non-contractible*. Non-contractible communication, which we model along the lines of Dewatripont and Tirole (2005), is a natural assumption in organizational economics.

The DM first purchases a certain amount of language proficiency λ in the market. We assume away the above-mentioned frictions (credit constraints, information frictions, etc.) to focus on our novel channel. The DM choses λ taking as given the wage premium associated with her investments as well as how much he is going to learn from the FM in the workplace. The amount of learning, however, depends on FM's communication effort, τ. We assume that this effort is *non-contractible*: i.e., the FM choses τ taking λ as given, maximizing her profits but disregarding the value of learning for the DM. We describe the private equilibrium, and compare it to the planner's allocation. Relative to the private equilibrium, the social planner would choose a higher communication effort τ: because of the non-contractibility of communication, the FM chooses an

[27] MNCs might be able to negotiate discounts like we did and offer cheaper training opportunities to DMs. We have no evidence that firms did so in our context.

inefficiently low τ for any level of λ. If the communication effort was contractible, the DM would pay the FM to increase her communication effort to the efficient level, given λ. DM's incentives to invest in language acquisition λ also differs from the social optimum, since the inefficiently low τ depresses the returns to language skills for the DM. Thus, the DM also underinvests in language skills, given τ.

Evidence

The assumption of non-contractible communication is a realistic description of life within an organization, and, indeed, is a cornerstone of several workhorse frameworks in organizational economics. In addition to Dewatripont and Tirole (2005), Crawford and Sobel (1982) and Dessein (2002), also formulate models with non-contractible communication and strategic information transmission. There is some suggestive evidence in support for the assumption in our context. We asked 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. Panel B of Figure C.6 shows the resulting distribution. 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. Furthermore, there is 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 C.6 reports the distribution of the DMs' WTP, as well as the average and maximum 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 hourly wage of the best paid FM in our sample. This wedge suggest that additional communication between DMs and FMs could increase total surplus. This evidence is in line with the non-contractibility assumption.

Besides the evidence, further considerations suggest that DMs and FMs are unlikely to be able to contract upon the desired amount of communication. If communication was contractible, we would expect the DM to pay for it by, for example, accepting lower wages. In our sample, DM's wages are instead positively correlated with communication with the FM (see Table 2). While the DM might be able to compensate the FM in other ways (e.g., through favors) we note that DMs and FMs rarely interact outside of working hours. One could imagine that relational contracts between the DM and FM might overcome the non-contractibility of communication. We think this

is unlikely in our context 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 may leave the MNC, and the FMs will 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). Indeed, the lack of a common language makes this harder. More generally, relative to a benchmark with perfect contractibility, Garicano and Rayo (2017) show that knowledge transfers through relational contracts are slow and incomplete.

5.3 Which policy instruments could be used to ameliorate the market outcome?

Taken together, there likely is a significant gap between the level of communication desired by the DM and what is provided by the FM. Does this imply that there is scope for policy intervention? Not necessarily. Presumably, the planner cannot directly target the source of inefficiency: the non-contractibility of communication within the firm. Any intervention from the planner, therefore, must take into account FMs and DMs endogenous responses. In Section 3, however, we showed that FM's communication is *complementary* with DM's language ability. This opens the door to a potential policy instrument: a subsidy to DM's language acquisition. By subsidizing DM's language acquisition, the planner might be able to move communication towards its efficient level. The model in the Appendix shows under what conditions this practical policy instrument can (partially) correct for the inefficiency.

The additional condition that justifies an intervention boils down to whether the DM fully internalizes the MNC's returns from his language investment or not. For example, if the DM and the FM were able to contract upon, and share the benefits from, the DM's language investment, a subsidy would not be effective. Similarly, a language subsidy would not be effective if DM's wage w fully reflected the MNC's returns from his investment. There is evidence that neither condition is likely to be satisfied in our context.

The FM and DM are unlikely to be able to efficiently negotiate on the DM's language skills. For example, even if firms were able to screen DMs for language ability or fire DMs that are unable to perform due to lack of language skills, this would not necessarily achieve the efficient amount of language skills (which also takes into account the future benefits from knowledge transfers to the DM). We also directly explored DM's and FM's ability to contract on DM's English proficiency by

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, 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.

A subsidy would also not be justified if the DM's private (marginal) return from language acquisition was higher than the marginal return for the MNC. Appendix A.1 provides back-of-the-envelope calculations suggesting that this is unlikely to be the case. This approach is admittedly speculative, because the returns for the MNC are not directly observed and must be calibrated using a combination of the "lab" results in Section 3.3 and descriptive evidence on the retention rate and the span-of-control for the average DM. Our calculations suggests that NPV is barely positive on average.[28] Still, from the point of view of the planner, what matters is the joint benefits of the MNC and the DMs, (who may or may not stay in the same firm). These combined benefits are positive 57.3% of the time. We conclude that the conditions that justify a language subsidy are likely verified in our context.

6 Conclusion

This paper provides evidence that reducing language barriers within MNCs can increase communication across employees of different nationalities. The communication with foreign managers is valued by domestic managers, and appears to transfer management knowledge, in particular through certain soft skills. The results reveal that a standard barrier within MNCs could ulti-

[28] For reference, Iacovone et al. (2022)'s management training program cost roughly $10,500. The average firm would recoup these costs within a year using the lower bound of returns. The language training course here cost $300 per worker, and the average firm would recoup an investment in language training for all its DMs within 15 months. Iacovone et al. (2022)'s training is an explicit management consulting designed to improve worker productivity in the specific tasks they perform, distinct from the general English training we provide. Further, their sample comprises smaller domestic firms, which primarily sell into the local market.

mately impede management knowledge transfers that are valued by the domestic market. Our results suggest that policymakers may need to implement policies complementary with the usual tools used to attract FDI (e.g., tax breaks, regulatory benefits, etc.) to address contextual factors, like language barriers, to maximize the potential for spillovers from FDI.

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, Rest of World (2023)). This might explain the rationale behind policies such as Uganda's compulsory inclusion of Mandarin in selected secondary schools, given the large inflow of Chinese FDI. More generally, 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. Moreover, fostering language acquisition during schooling may be even more effective (Dixon et al. 2012), and generate benefits beyond the increased job opportunities to communicate with expat managers.

References

Abebe, G., M. Fafchamps, M. Koelle, and S. Quinn (2019): "Learning management through matching: A field experiment using mechanism design," Tech. rep., NBER 26035.

Acemoglu, D. and J.-S. Pischke (1998): "Why do firms train? Theory and evidence," *The Quarterly journal of economics*, 113, 79–119.

Adhvaryu, A., N. Kala, and A. Nyshadham (2022): "Returns to On the Job Soft Skills Training," *Journal of Political Economy.*

Aitken, B. J. and A. E. Harrison (1999): "Do domestic firms benefit from direct foreign investment? Evidence from Venezuela," *American economic review*, 89, 605–618.

Alfaro-Urena, A., I. Manelici, and J. Vasquez (2019): "The Effects of Multinationals on Workers: Evidence from Costa Rica," Tech. rep., London School of Economics.

Alfaro-Urena, A., I. Manelici, and J. P. Vasquez (2022): "The Effects of Joining Multinational Supply Chains: New Evidence from Firm-to-Firm Linkages*," *The Quarterly Journal of Economics*, 137, 1495–1552.

Antràs, P., L. Garicano, and E. Rossi-Hansberg (2006): "Offshoring in a knowledge economy," *The Quarterly Journal of Economics*, 121, 31–77.

Antràs, P. and E. Rossi-Hansberg (2009): "Organizations and Trade," *Annual Review of Economics*, 1, 43–64.

Antràs, P., E. Rossi-Hansberg, and L. Garicano (2008): *Organizing Offshoring: Middle Managers and Communication Costs*, Cambridge, MA: Harvard University Press, 311–39.

Antràs, P. and S. R. Yeaple (2014): "Chapter 2 - Multinational Firms and the Structure of International Trade," in *Handbook of International Economics*, ed. by G. Gopinath, E. Helpman, and K. Rogoff, Elsevier, vol. 4 of *Handbook of International Economics*, 55 – 130.

Atkin, D., A. Chaudhry, S. Chaudry, A. K. Khandelwal, and E. Verhoogen (2017): "Organizational Barriers to Technology Adoption: Evidence from Soccer-Ball Producers in Pakistan*," *The Quarterly Journal of Economics*, 132, 1101–1164.

Atkin, D., M. K. Chen, and A. Popov (2022): "The returns to face-to-face interactions: Knowledge spillovers in Silicon Valley," Tech. rep., National Bureau of Economic Research.

Atkin, D. and A. K. Khandelwal (2020): "How Distortions Alter the Impacts of International Trade in Developing Countries," *Annual Review of Economics*, 12, 213–238.

Attanasio, O. and K. Kaufmann (2009): "Educational choices, subjective expectations, and credit constraints," Tech. rep., NBER 15087.

Bai, J., P. Barwick, S. Cao, and S. Li (2021): "Quid Pro Quo, Knowledge Spillover and Industrial Quality Upgrading," .

Bai, J., M. Chen, J. Liu, X. Mu, and D. Y. Xu (2020): "Search and Information Frictions on Global E-Commerce Platforms: Evidence from AliExpress," Working Paper 28100, NBER 28100.

Battiston, D., J. Blanes i Vidal, and T. Kirchmaier (2021): "Face-to-Face Communication in Organizations," *The Review of Economic Studies*, 88, 574–609.

Becker, G. S. (1962): "Investment in human capital: A theoretical analysis," *Journal of political economy*, 70, 9–49.

Bianchi, N. and M. Giorcelli (2022): "The Dynamics and Spillovers of Management Interventions: Evidence from the Training Within Industry Program," *Journal of Political Economy*, 130, 1630–1675.

Bisztray, M., M. Koren, and A. Szeidl (2018): "Learning to import from your peers," *Journal of International Economics*, 115, 242–258.

Blonigen, B. A. and J. Piger (2014): "Determinants of foreign direct investment," *Canadian Journal of Economics*, 47, 775–812.

Bloom, N., E. Brynjolfsson, L. Foster, R. Jarmin, M. Patnaik, I. Saporta-Eksten, and J. Van Reenen (2019): "What Drives Differences in Management Practices?" *American Economic Review*, 109, 1648–83.

Bloom, N., B. Eifert, A. Mahajan, D. McKenzie, and J. Roberts (2012a): "Does Management Matter? Evidence from India *," *The Quarterly Journal of Economics*, 128, 1–51.

Bloom, N., L. Garicano, R. Sadun, and J. Van Reenen (2014): "The distinct effects of information technology and communication technology on firm organization," *Management Science*, 60, 2859–2885.

Bloom, N., A. Mahajan, D. McKenzie, and J. Roberts (2020): "Do Management Interventions Last? Evidence from India," *American Economic Journal: Applied Economics*, 12, 198–219.

Bloom, N., R. Sadun, and J. Van Reenen (2012b): "Americans do IT better: US multinationals and the productivity miracle," *American Economic Review*, 102, 167–201.

——— (2016): "Management as a Technology?" Working Paper 22327, National Bureau of Economic Research.

Bloom, N. and J. Van Reenen (2007): "Measuring and explaining management practices across firms and countries," *The quarterly journal of Economics*, 122, 1351–1408.

Borensztein, E., J. De Gregorio, and J.-W. Lee (1998): "How does foreign direct investment affect economic growth?" *Journal of international Economics*, 45, 115–135.

Bubb, R., S. Kaur, and S. Mullainathan (2018): "The limits of neighborly exchange," *Unpublished manuscript, Poverty Action Lab.[430]*.

Burchardi, K. B., T. Chaney, and T. A. Hassan (2019): "Migrants, Ancestors, and Foreign Investments," *The Review of Economic Studies*, 86, 1448–86.

Burstein, A. T. and A. Monge-Naranjo (2009): "Foreign know-how, firm control, and the income of developing countries," *The Quarterly Journal of Economics*, 124, 149–195.

Cai, J. and A. Szeidl (2017): "Interfirm Relationships and Business Performance," *The Quarterly Journal of Economics*, 133, 1229–1282.

Caliendo, L. and E. Rossi-Hansberg (2012): "The impact of trade on organization and productivity," *The quarterly journal of economics*, 127, 1393–1467.

Chassang, S. (2010): "Building Routines: Learning, Cooperation, and the Dynamics of Incomplete Relational Contracts," *American Economic Review*, 100, 448–65.

Chen, M. X. and M. Wu (2021): "The Value of Reputation in Trade: Evidence from Alibaba," *The Review of Economics and Statistics*, 103, 857–873.

Cohen, W. M. and D. A. Levinthal (1990): "Absorptive capacity: A new perspective on learning and innovation," *Administrative science quarterly*, 128–152.

Crawford, V. P. and J. Sobel (1982): "Strategic information transmission," *Econometrica: Journal of the Econometric Society*, 1431–1451.

Debaere, P., H. Lee, and J. Lee (2013): "Language, ethnicity and intrafirm trade," *Journal of Development Economics*, 103, 244–253.

DeFilippis, E., S. M. Impink, M. Singell, J. T. Polzer, and R. Sadun (2020): "Collaborating During Coronavirus: The Impact of COVID-19 on the Nature of Work," Working Paper 27612, National Bureau of Economic Research.

Dessein, W. (2002): "Authority and communication in organizations," *The Review of Economic Studies*, 69, 811–838.

Dessein, W. and T. Santos (2006): "Adaptive organizations," *Journal of political Economy*, 114, 956–995.

Dewatripont, M. and J. Tirole (2005): "Modes of communication," *Journal of political economy*, 113, 1217–1238.

Dixon, L. Q., J. Zhao, J.-Y. Shin, S. Wu, J.-H. Su, R. Burgess-Brigham, M. U. Gezer, and C. Snow (2012): "What we know about second language acquisition: A synthesis from four perspectives," *Review of Educational Research*, 82, 5–60.

EPI, E. F. (2020): "EF English proficiency index," *Education First Retrieved from Education First Rankings*.

Espinosa, M. and C. T. Stanton (2022): "Training, Communications Patterns, and Spillovers Inside Organizations," Working Paper 30224, National Bureau of Economic Research.

Garicano, L. (2000): "Hierarchies and the Organization of Knowledge in Production," *Journal of political economy*, 108, 874–904.

Garicano, L. and L. Rayo (2017): "Relational Knowledge Transfers," *American Economic Review*, 107, 2695–2730.

Garicano, L. and E. Rossi-Hansberg (2015): "Knowledge-Based Hierarchies: Using Organizations to Understand the Economy," *Annual Review of Economics*, 7, 1–30.

Gibbons, R. and R. Henderson (2012): "Relational contracts and organizational capabilities," *Organization science*, 23, 1350–1364.

Gibbons, R., M. LiCalzi, and M. Warglien (2021): "What Situation Is This? Shared Frames and Collective Performance," *Strategy Science*.

Giorcelli, M. (2019): "The long-term effects of management and technology transfers," *American Economic Review*, 109, 121–52.

Giorcelli, M. and B. Li (2021): "Technology Transfer and Early Industrial Development: Evidence from the Sino-Soviet Alliance," Tech. rep., National Bureau of Economic Research.

Gupta, A., J. Ponticelli, and A. Tesei (2022): "Language Barriers, Technology Adoption and Productivity: Evidence from Agriculture in India," Tech. rep., mimeo, Northwestern University.

Harrison, A. and A. Rodriguez-Clare (2010): "Trade, foreign investment, and industrial policy for developing countries," in *Handbook of development economics*, Elsevier, vol. 5, 4039–4214.

Helpman, E., M. J. Melitz, and S. R. Yeaple (2004): "Export versus FDI with heterogeneous firms," *American economic review*, 94, 300–316.

Hoya, C., A. McCallum, A. Patel, and T. Wilson (2018): "Measuring the impact of Community-Based English Language Provision: Findings from a Randomised Controlled Trial," *UK Ministry of Housing Communities and Local Government*.

Iacovone, L., W. Maloney, and D. McKenzie (2022): "Improving management with individual and group-based consulting: Results from a randomized experiment in colombia," *The Review of Economic Studies*, 89, 346–371.

Javorcik, B. (2004): "Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages," *American economic review*, 94, 605–627.

Karlan, D., A. L. Ratan, and J. Zinman (2014): "Savings by and for the Poor: A Research Review and Agenda," *Review of Income and Wealth*, 60, 36–78.

Kaufmann, K. M. (2014): "Understanding the income gradient in college attendance in Mexico: The role of heterogeneity in expected returns," *Quantitative Economics*, 5, 583–630.

Keller, W. (1996): "Absorptive capacity: On the creation and acquisition of technology in development," *Journal of development economics*, 49, 199–227.

Keller, W. and S. R. Yeaple (2013): "The Gravity of Knowledge," *American Economic Review*, 103, 1414–44.

Kessler, J. B., C. Low, and C. D. Sullivan (2019): "Incentivized resume rating: Eliciting employer preferences without deception," *American Economic Review*, 109, 3713–44.

Khanna, T., J. Song, and K. Lee (2011): "The Paradox of Samsung's Rise," *Harvard Business Review*.

Kubota, Y. (2015): "Honda To Set English as Official Language," *The Wall Street Journal, 6/30/2015*.

Lagakos, D., B. Moll, T. Porzio, N. Qian, and T. Schoellman (2018): "Life cycle wage growth across countries," *Journal of Political Economy*, 126, 797–849.

Macchiavello, R. (2022): "Relational Contracts and Development," *Annual Review of Economics*, 14, 337–362.

Macchiavello, R. and A. Morjaria (2015): "The Value of Relationships: Evidence from a Supply Shock to Kenyan Rose Exports," *American Economic Review*, 105, 2911–45.

Macchiavello, R., A. Rabbani, and C. Woodruff (2015): "The market for training services: a demand experiment with Bangladeshi garment factories," *American Economic Review*, 105, 300–304.

McKenzie, D. (2012): "Beyond baseline and follow-up: The case for more T in experiments," *Journal of development Economics*, 99, 210–221.

McKenzie, D. and C. Woodruff (2014): "What Are We Learning from Business Training and Entrepreneurship Evaluations around the Developing World?" *World Bank Research Observer*, 29, 48–82.

Polanyi, M. (1966): *The Tacit Dimension*, Garden City, NY: Doubleday.

Rauch, J. E. and V. Trindade (2002): "Ethnic Chinese Networks In International Trade," *The Review of Economics and Statistics*, 84, 116–130.

Reed, T. and T. T. Tran (2019): *The Large-Firm Wage Premium in Developing Economies*, The World Bank.

Rest of World (2023): "Inside Foxconn's struggle to make iPhones in India," *Rest of World*.

Rodrik, D. (2004): "Industrial Policy for the Twenty-First Century," Cepr discussion papers, UNIDO.

Sandvik, J. J., R. E. Saouma, N. T. Seegert, and C. T. Stanton (2020): "Workplace Knowledge Flows," *The Quarterly Journal of Economics*, 135, 1635–1680.

Startz, M. (2021): "The value of face-to-face: Search and contracting problems in Nigerian trade," Tech. rep., Stanford University.

Stiglitz, J. E. and P. Dasgupta (1971): "Differential taxation, public goods, and economic efficiency," *The Review of Economic Studies*, 38, 151–174.

Wolinsky, A. (1983): "Prices as signals of product quality," *The review of economic studies*, 50, 647–658.

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
Monthly 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
Monthly 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
Monthly 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	
	Log wage	BvR Mngt /15	Invt. (1-4)	Freq. FM (1-4)	Direct FM (0/1)	Freq. (1-4)	Time lost (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
English	0.206***	0.242**	0.180***	0.153***	0.086***		
	(0.034)	(0.106)	(0.062)	(0.057)	(0.032)		
FM						-0.751***	27.748***
						(0.056)	(1.204)
FM × English						0.204***	-10.877***
						(0.059)	(1.285)
Dem. controls	Yes	Yes	Yes	Yes	Yes	No	No
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DM FEs	No	No	No	No	No	Yes	Yes
Mean of Dep. Var.	13.01	9.22	2.09	2.48	0.32	2.82	13.87
R2	0.69	0.27	0.42	0.35	0.34	0.62	0.73
N	345	375	375	350	375	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 log monthly salary. Column 2 is the score on the 15 MOPS management practice questions. Column 3 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 4 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 5 is an indicator 1 if the DM reports an FM as a direct boss. Columns 6-7 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 7 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 firm-department level, and in columns 5-6 they are clustered at the DM level. Significance: *** 1%, ** 5%, * 10%.

Table 3: Take-Up and English Proficiency

	First stage		Overall		Speaking		Listening	
	Takeup> 75%	Takeup c.	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	0.456***	0.568***	0.153**	0.257**	0.212**	0.346**	0.142	0.237
	(0.048)	(0.036)	(0.074)	(0.116)	(0.103)	(0.156)	(0.106)	(0.167)
Baseline value	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Strata FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	0.00	0.00	-0.08	-0.08	-0.07	-0.07	-0.10	-0.10
1st stage F-stat				278		315		276
R2	0.37	0.58	0.47	0.48	0.45	0.45	0.29	0.30
N	298	298	267	267	244	244	265	265

Notes: Table reports treatment effects on takeup of English classes and English score. Column 1 is takeup defined as a dummy that turns 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 overall English score, and is the average of the (standardized) speaking and listening scores. Columns 5-6 reports the standardized speaking score, and columns 7-8 report the standardized listening score. Columns 3-8 control for baseline values of the dependent variables; the number of observations in columns 5-6 are lower because the recording quality at baseline was too low for 24 DMs and the external graders were unable to score their speaking ability (the p-value for missing scores between treatment and control is 0.55). All regressions control for the mode of endline and include strata fixed effects. Standard errors are reported in parenthesis and clustered at the firm-department level. Significance: *** 1%, ** 5%, * 10%.

Table 4: Communication

	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	0.200**	0.331**	0.072	0.119	-1.969	-3.244	-0.030	-0.049	0.039	0.064
	(0.098)	(0.150)	(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	2.31	2.31	0.43	0.43	17.45	17.45	3.11	3.11	0.71	0.71
1st stage F-stat		329		288		282		307		288
R2	0.36	0.37	0.27	0.28	0.22	0.22	0.14	0.14	0.15	0.15
N	272	272	261	261	223	223	258	258	261	261

Notes: Table 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 a 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. All regressions control for the mode of endline and include firm fixed effects. Standard errors are reported in parenthesis and clustered at the firm-department level. Significance: *** 1%, ** 5%, * 10%.

Table 5: 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		54		54		54		54
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		66		66		66
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 firm-department level. Significance: *** 1%, ** 5%, * 10%.

Table 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 firm-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. For wages as outcomes and exits, we complement with administrative data when possible. Standard errors clustered by firm-department. Significance: *** 1%, ** 5%, * 10%.

Table 7: 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. Significance: *** 1%, ** 5%, * 10%.

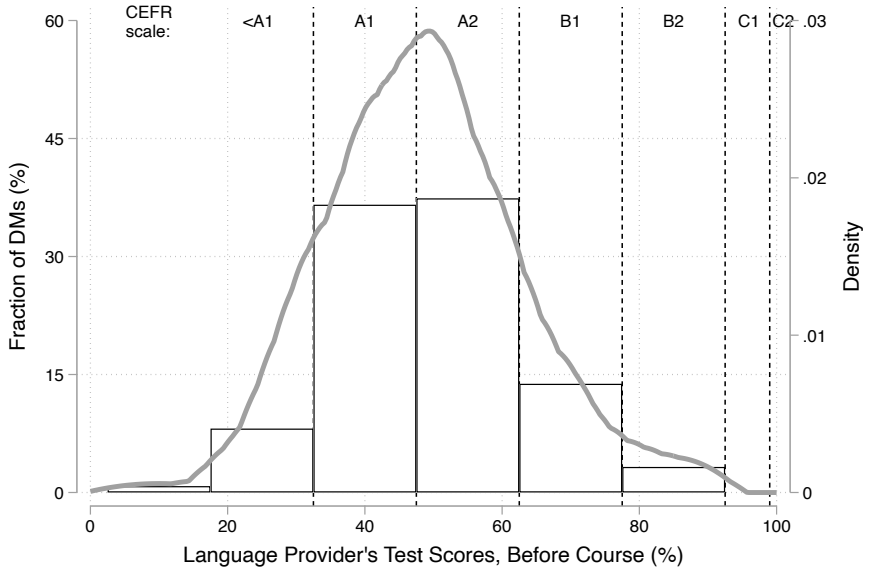
Table 8: Characteristics Valued by HR Managers: Interview Responses

	Wage offer (USD)	Perceived learning (1-10)
	(1)	(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

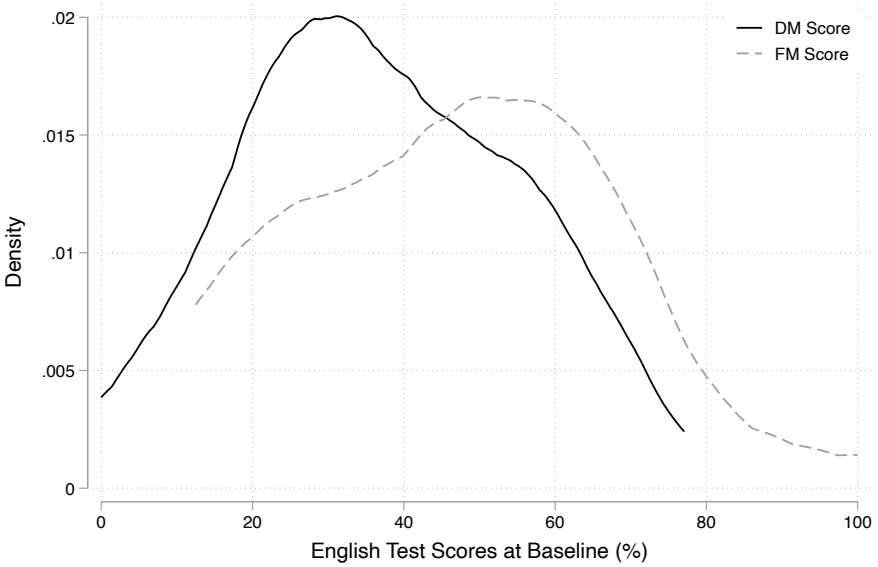
Notes: Table shows regressions of hypothetical job candidate characteristics on wage offers and learning scores as stated by the 51 HR manager respondents. Dependent variable in the first column is the wage offer stated by the respondent for the profile. Dependent variable in the second column is an 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. Significance: *** 1%, ** 5%, * 10%.

Figure 2: 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 C.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. Model

This section presents a model of interactions between FMs and DMs. The purpose of the model is to explain why there may be an under-investment in language ability despite the benefits from lower communication barriers. The model clarifies potential sources of inefficiencies, and provides guidance on the settings where the communication frictions are likely to matter most.

In the model, a DM (he) learns general management by communicating with an FM (she), as suggested in Section 4. To communicate with and to learn from the FM, he must acquire some language ability (e.g., English). We assume that language ability is complementary with the FM's communication effort, as demonstrated in Section 3. Note that English proficiency is itself a general skill, and we should not expect employers to pay for it (Becker 1962). Indeed, at baseline only two firms in our sample had paid for any formal English training for their DMs. However, the DM may find it worthwhile to invest in English acquisition on his own. In practice, he may be constrained by many frictions that the literature has often linked to low levels of workers' investment in general skills; for example, credit constraints, behavioral biases, and information imperfections may blunt incentives to learn English. Here, we set aside these barriers and instead focus on a new source of inefficiency motivated by the organizational environment we study: communication within the MNC is *non-contractible*. Non-contractible communication, which we model along the lines of Dewatripont and Tirole (2005), is a natural assumption in organizations and a cornerstone of organizational economics. Below, we offer evidence that this assumption fits our setting. In equilibrium, the communication effort supplied by the FM is inefficient because it only takes into account the returns from communication inside the MNCs, and not the (additional) returns that accrue to the DM from learning management skills. The planner cannot directly target the within-firm non-contractibility, but could employ a practical policy instrument – language subsidies – to partially correct for the resulting inefficiency. We derive the exact conditions that would support such an intervention and assess their empirical relevance.

Model Set-Up

We consider a three-period model with a single DM and a FM. 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 exclusively on the interaction between DM and FM, we deliberately abstract from production workers.

We 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. Essentially, this assumption says that, unlike a foreign language, management must be learned on the job rather than in a classroom.

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 a *complementarity*: the FM's communication effort is more effective as the DM's language proficiency rises (as per results from the language experiment in Section 3). We denote $\gamma(\tau) = \gamma\tau$ the cost of communication to the FM. This communication effort is *non-contractible*. 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 states 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 lengthier taxonomy of cases, makes further communication with the FM in $t = 2$ 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* (as per results from the resume protocol and survey evidence in Section 4). 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 – i.e., that foreign language is not a general skill. While this might appear as a strong assumption, we make it here for simplicity only to focus our attention on the role of non-contractible communication. We discuss this assumption below and show that 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 $w_0 < \phi\frac{\lambda}{\gamma}$.[29]

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.

[29] As discussed 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.

Equilibrium

We describe the private equilibrium, and compare it to the planner's allocation to highlight how the non-contractibility of communication leads to a socially inefficient equilibrium.

Private Equilibrium

We solve for the unique sub-game perfect equilibrium through backward induction. 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.

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 ($a = 1$).[30]

[30] 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.

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.

First Best Communication and Language Acquisition

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:

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

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 MNC's returns from his investment in language in $t = 1$, which is $\theta(\kappa_1, \chi) - \gamma\tau = \frac{\lambda}{\gamma}$

in the private equilibrium. Thus, the DM also underinvests in language skills, given τ. The second source of inefficiency would be removed if the DM and the FM were able to contract upon, and share the benefits from, the DM's language investment. This is unlikely to be the case in our context. Similarly, the case for policy intervention would be muted if DM's wage w fully reflected the MNC's returns from his investment. Back of the envelope calculations reported below suggest that this is unlikely to be the case.

Subsidizing Language Acquisition

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). A practical policy instrument is to subsidize 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). Assuming a marginal cost of public funds (Stiglitz and Dasgupta 1971) equal to 1, the planner sets the subsidy s solving the following program:

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

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

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 $\tau^* < \tau^s < \tau^{SP}$.

The results are robust to more general formulations for the planner's costs of public funds and objective function. First, consider the case where the marginal cost of public funds is $\Psi > 1$. If the marginal cost of public funds is not too high, $\Psi < 1 + \frac{1}{2\phi - \gamma c}$, it remains optimal for the planner to subsidize the acquisition of language skills; however, the subsidy in this case would be lower and thus the attained allocation further away from the first best. With $\Psi > 1$, the optimal subsidy is increasing in the cost of providing language training, c, i.e. countries with higher language proficiency should subsidize less. Similarly, 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 improve the institutional environment in which the MNCs operate are successful in attracting FDI. A 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.

Conditions for a Subsidy

A subsidy is *not* justified if the FM and the DM can perfectly contract on the amount of language skills λ. When this is the case, the DM and the FM 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. Furthermore, in Section 5.3, we discussed results from an experimental protocol that suggests that FMs and DMs are unlikely to maximize joint surplus in language training attendance decisions.

Even if the DM and FM cannot contract on the amount of language skills λ, a subsidy might still not be justified. We have so far assumed that the wage w earned by the DM does not depend on λ. While we make this assumption for simplicity, it is a strong assumption and one that it is important to relax to discuss the empirical relevance of the case for a subsidy.

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 $\frac{\partial(\theta(\kappa_1,\chi)-\gamma\tau)}{\partial\lambda}\Big|_{\tau=\lambda/\gamma^2} = 1/\gamma$. The condition can be violated if, e.g., 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 $w_0'(\lambda) \geq 1/\gamma$.

A.1 NPV Calculation

We provide back-of-envelope estimations to show that the DMs' NPV from purchasing our training program would be lower than the marginal benefit for the MNC ($w_0'(\lambda) \geq 1/\gamma$). We compute the DM's returns from improving English as follows: 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 7). Thus, the monthly wage increase expected based on the English proficiency gained from the language training using the $0.15sd$ ITT effect is $\Delta w = \$3.6 = \$51.3 \times 0.15 \div 2.2$. We calculate the NPVs for the language training for each DM i as,

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

We set r_i, the monthly interest rate, to 1.2%. 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 ($300). Panel A of Figure C.7 indicates that none of the DMs would pay for this specific language training on their own; this finding is consistent with the model's implication that there is a diminished incentive for DMs to invest further in English given the non-contractibility of communication, among other sources of inefficiency discussed in Section 5.

We calibrate the benefit of the language training for each MNC f as,

$$NPV_f = \frac{1}{r+p}(0.15 \times w_{PW,f} \times SC_{DM,f}^{0.5} - 0.19 \times w_{FM,f} \times t_{FM,f}) - C$$

We set r, the monthly interest rate, to 1.2%. The remaining variables are as follows: p is the monthly probability of the DM leaving which we set at a conservative estimate of 3%, $w_{PW,f}$ 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 and 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 variables 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 ($300). The numbers 0.15 and -0.19 reflect the percentage gain and loss respectively in terms of "PW" and "FM" time from the management simulation exercise in Table 5. Panel B of Figure C.7 shows that this NPV is positive on average for under half the firms. But from the point of view of the planner, what matters is the joint benefits of the MNC and the DMs, who may or many not stay in the same firm.

While the combined NPV of the training for the MNC and the DM is positive 57.3% of the time, the condition $w_0'(\lambda) \geq 1/\gamma$ remains violated in most cases. We conclude that the conditions that justify a language subsidy are likely verified in our context, which we have shown above is quite typical of developing countries in the region, and would raise welfare.

B. Willingness to Pay for More Communication with FMs

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 their FM or another domestic manager who is more senior. Asking WTP for the latter benchmarks their interest in speaking with someone higher in the organization as opposed to the foreign manager. In this way, we test the manager's own assessment of the value of the training she/he can acquire from communicating with FMs. Panel A in Table B.1 shows that treated individuals are willing to pay $32.7 more to spend an hour with the FM. The effect is more than twice as large when looking at the TOT: treated DMs are willing to pay $53.6 more than DMs in the control group to spend time with their FMs.

One concern is that the difference between WTP for FM and DM across treatment and control can be accounted for by "schmoozing" or a desire to influence FMs, rather than opportunities for further learning. In Panel A, columns 3-4 of Table B.1 we ask DMs for their WTP for a one hour conversation with a hypothetical FM working at a different firm. Treated DMs are still WTP to pay $19.1 more than control individuals for this opportunity. The differential is smaller than in column 1, so the previous question could capture some elements of networking (as opposed to learning), but the result here suggests that English skills increase the DM's valuation for time spent with any FM, and provides further support for the complementarity result. Another potential concern could be that the language training improves confidence and increases the returns to networking or learning from the FM. The appropriate test for isolating the confidence induced effects would be to elicit the WTP for conversation with an English-speaking FM vs a Non-English-speaking FM. However, in our setting this would be infeasible since DM proficiency in a third language is low.

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 FMs. 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 DM (Panel A, columns 5-6 of Table B.1). We observe no differential reported WTP between treatment and control. However, it may only partially alleviate these concerns as improved confidence may increase the returns to networking with FMs more than other DMs.

Panel B of Table B.1 examines involvement in the firm's management. 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 0.13, an effect that is both economically and statistically significant. We find no differential involvement of treated individuals in communicating targets (columns 3-4), but this may not be surprising since many DMs in the sample are not directly involved in production, and for those who are (e.g., line supervisors) targets may be written on boards displayed on the factory floor.

We then examine DMs' knowledge of management best practices in columns 5-6. As explained in Section 2.3, we follow the multiple choice questions in the "management practices" section of MOPS. We then score each question and obtain a total "management score".[31] 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 aspects of management learned by treatment DMs via the FMs are more nuanced than these management questions.

[31] When we moved to the phone endline due to Covid-19, we opted to reduce survey length and retained only two MOPS questions (one about monitoring and one about targets) for this sample. The regression controls for this switch through the endline mode dummy.

Table B.1: DMs' Willingness-to-Pay for Additional Meetings and Self-reported Management

	Panel A: WTP					
	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		274		243
R2	0.16	0.13	0.15	0.13	0.13	0.13
N	212	212	269	269	220	220

	Panel B: Management					
	Score (/15)		Involvement (1-4)			
	Management		People		Targets	
	ITT	TOT	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.070	0.117	0.127**	0.215**	-0.015	-0.026
	(0.114)	(0.179)	(0.059)	(0.092)	(0.090)	(0.143)
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	6.32	6.32	2.27	2.27	2.67	2.67
1st stage F-stat		283		289		272
R2	0.94	0.94	0.68	0.69	0.39	0.39
N	272	272	272	272	272	272

Notes: Panel A 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. Panel B reports treatment effects on management. Columns 1-2 is the score on the 15 MOPS management questions. Columns 3-4 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 5-6 is involvement in setting targets (same scale). All regressions control for the mode of endline and include firm fixed effects. Standard errors are reported in parenthesis and clustered at the firm-department level. Significance: *** 1%, ** 5%, * 10%.

C. Appendix Tables and Figures

Table C.1: Baseline Balance for Language Experiment

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

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 firm-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. Significance: *** 1%, ** 5%, * 10%.

Table C.2: 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 C.3: 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 of 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 firm-department level. Significance: *** 1%, ** 5%, * 10%.

Table C.4: Spillovers to Control DMs

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

	Panel B: Management simulation							
	Instructions in English				Instructions in Burmese			
	"PWs" Time	"PWs" Mistakes	"FMs" Time	"FM" Questions	"PWs" Time	"PWs" Mistakes	"FM" Time	"FM" Questions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share Treatment	0.006	-0.006	-0.008*	-0.007	-0.005	-0.003	-0.001	0.003
	(0.007)	(0.008)	(0.004)	(0.009)	(0.005)	(0.006)	(0.005)	(0.011)
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	0.22	0.25	0.60	0.37	0.35	0.28	0.31	0.11
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 share of DMs treated in the control DM's department . Panel A examines English and communication outcomes. Panel B examines outcomes from the management simulation. Significance: *** 1%, ** 5%, * 10%.

Table C.5: 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 C.6: Donor Pool of Characteristics and "Interview" Responses

Panel A: Donor Pool of Profile Characteristics

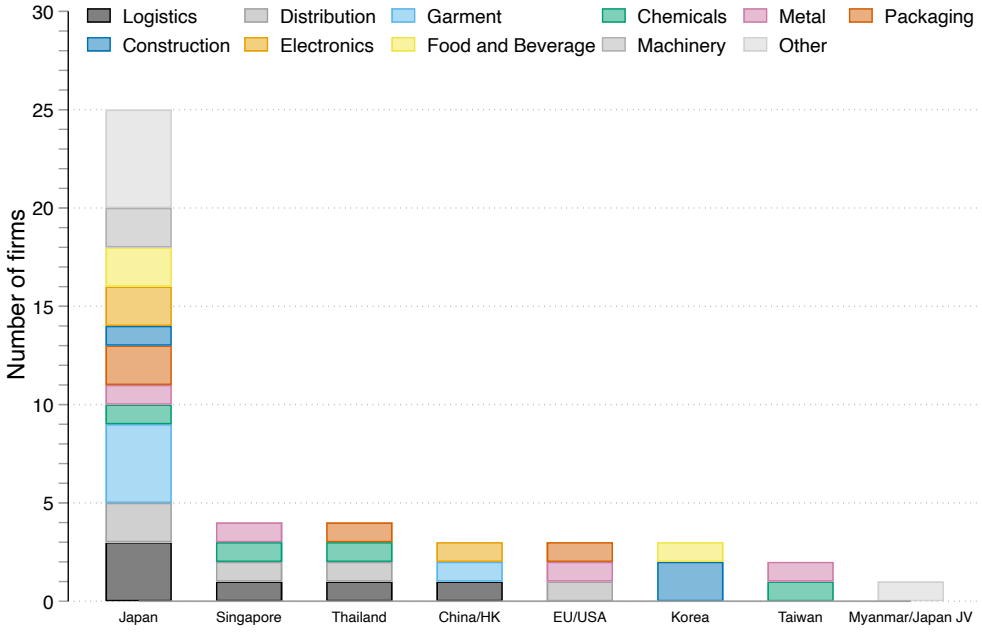
Criteria	Values
Gender	{Male, Female}
Age	{25, 26}
English level	{Elementary, Advanced}
Previous company ownership	{Myanmar, Japanese}
Previous company size	{25 employees, 125 employees}
Work experience	{1 year, 3 years}

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.

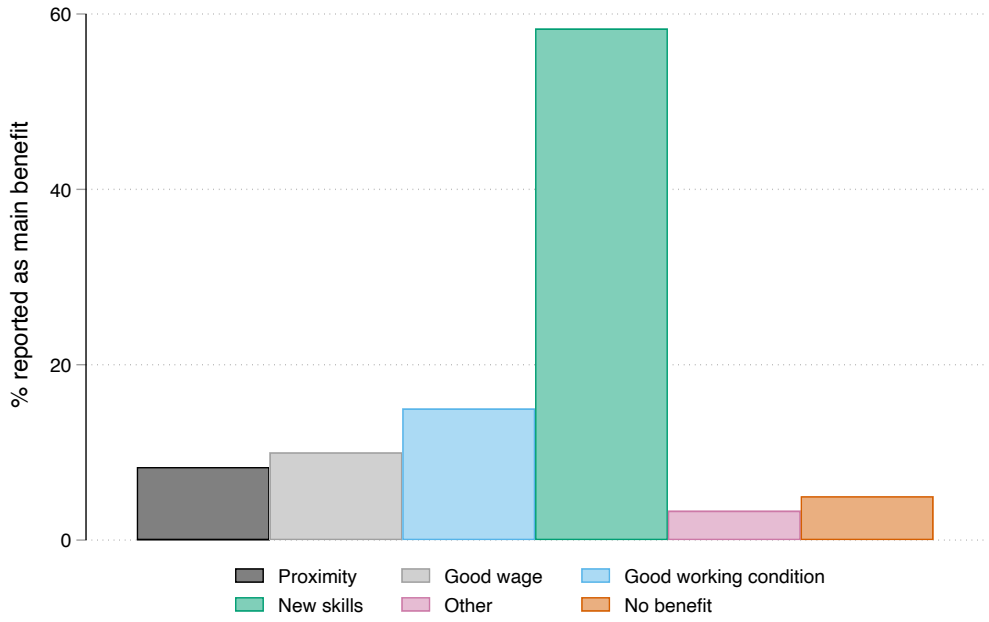
Figure C.1: Firms by Origin and Sector



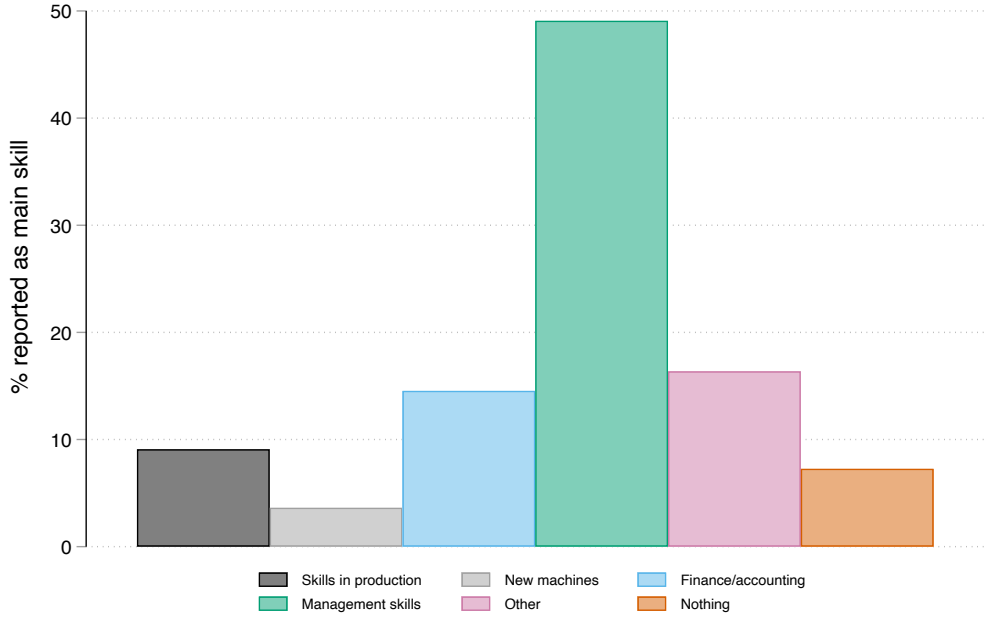
Notes: Figure displays the origin and sectors of the MNCs operating at the SEZ in 2018. One firm is majority Myanmar owned but is partially owned by a Japanese consortium and the CEO of the firm is an foreign expat, and so we include this firm in the analysis.

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

Panel A: Benefits of Working at MNCs

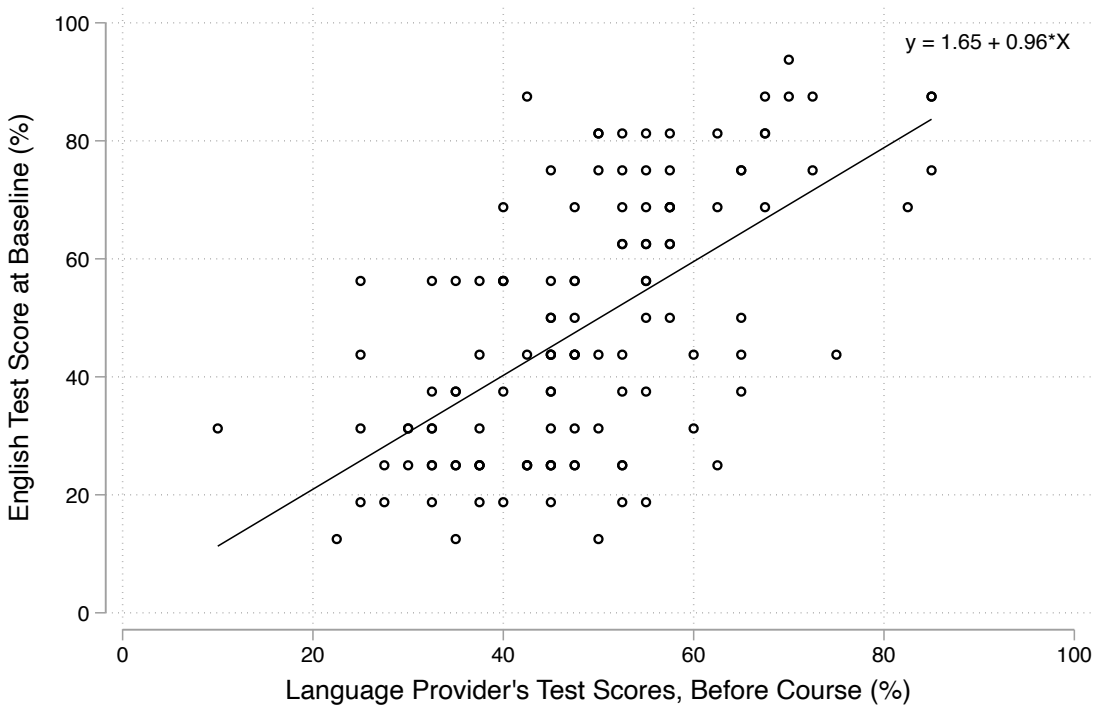


Panel B: Skills Expected to Learn



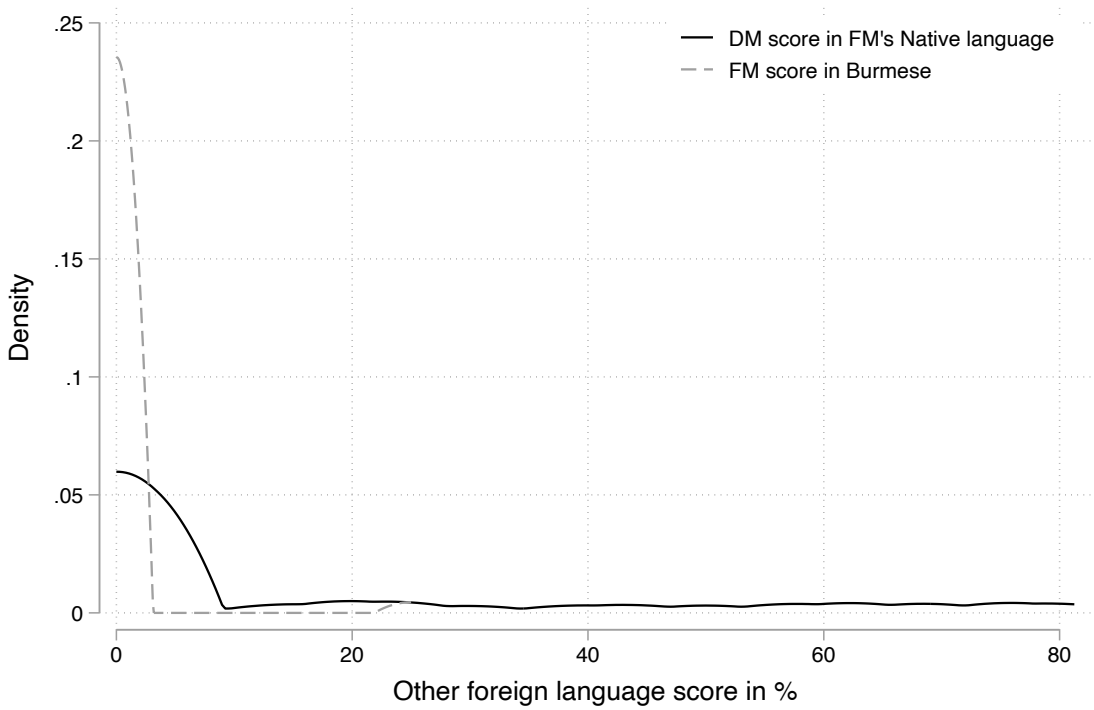
Notes: Figure displays the share of DMs who reported the particular benefit as their primary benefit of working at MNCs in the SEZ (Panel A) and the share of DMs that reported the particular skill as the primary skill they were hoping to acquire (Panel B). These data come from a pilot survey conducted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

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



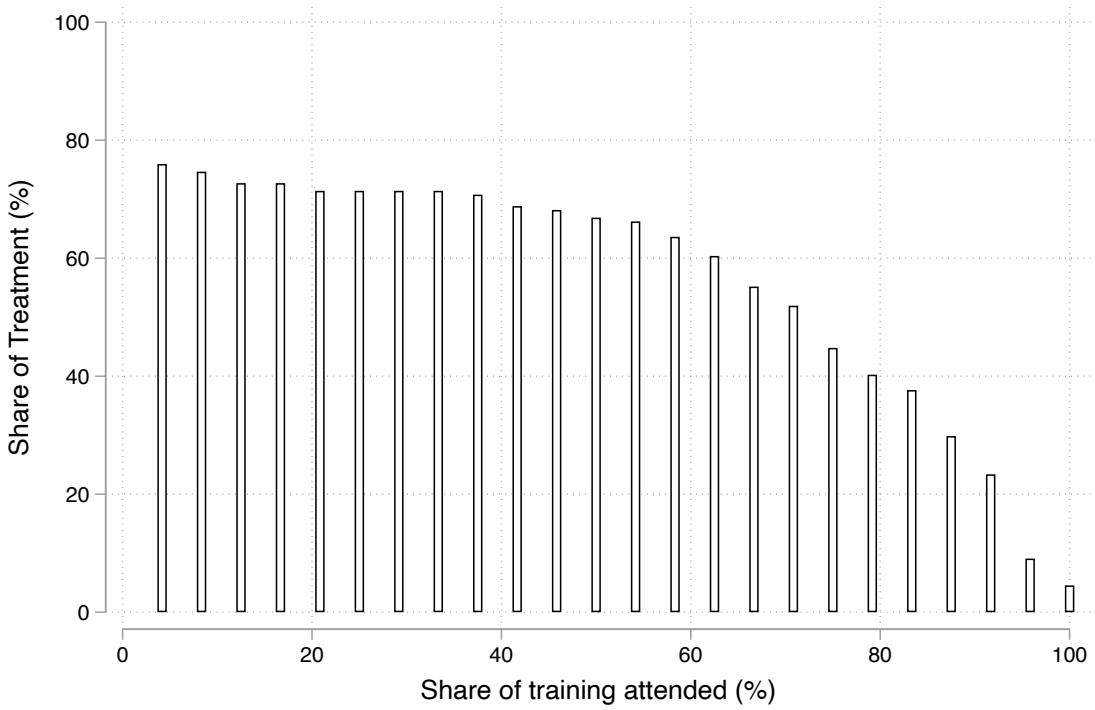
Notes: Figure displays a scatter plot and the line of best fit of the score obtained in the test administered by language training provider and the score obtained on our tailored English test for the N=123 DMs who took both assesments.

Figure C.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.

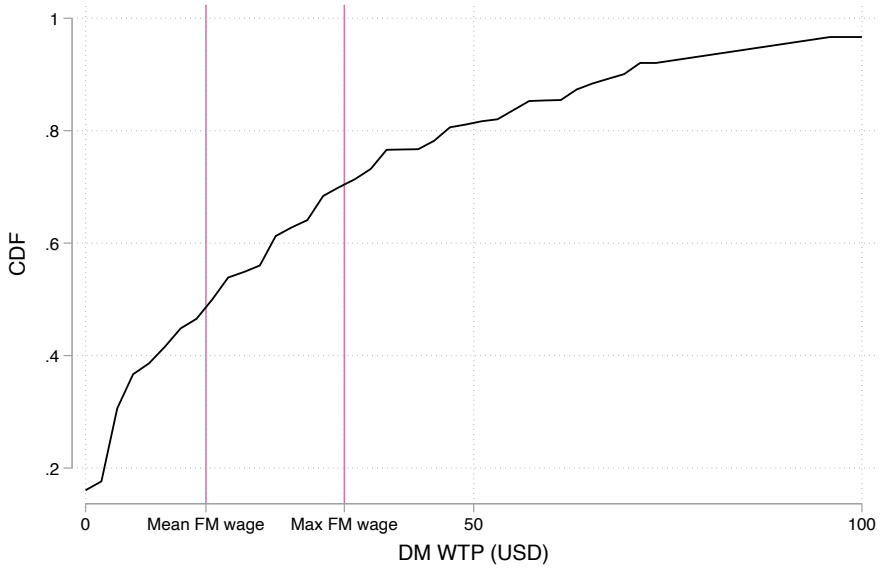
Figure C.5: Attendance by Treatment DMs



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).

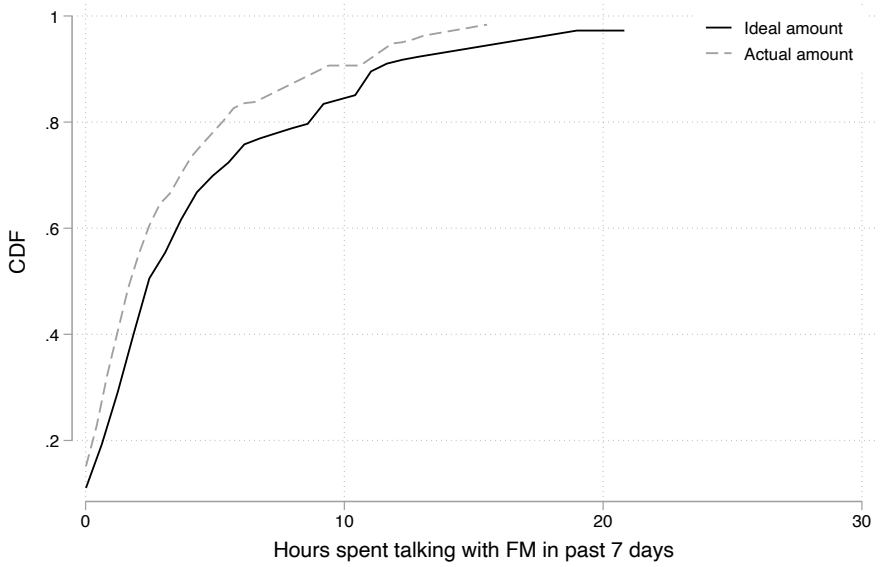
Figure C.6: Non-Contractibility of Communication

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.

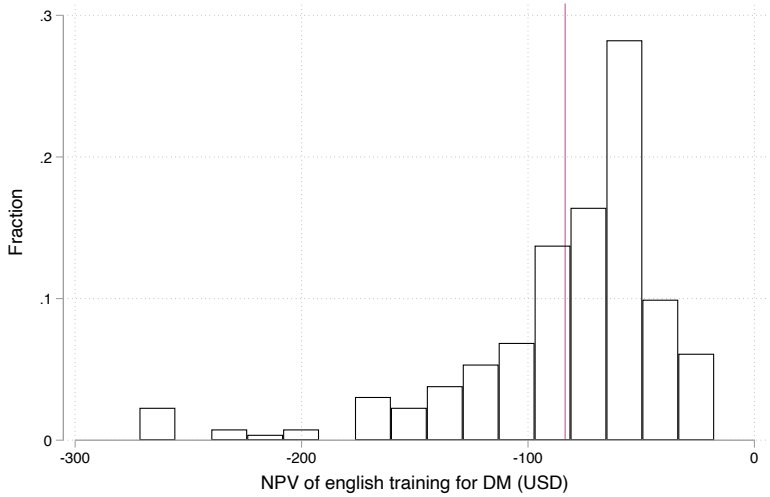
Panel B: Ideal vs Actual communication



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.

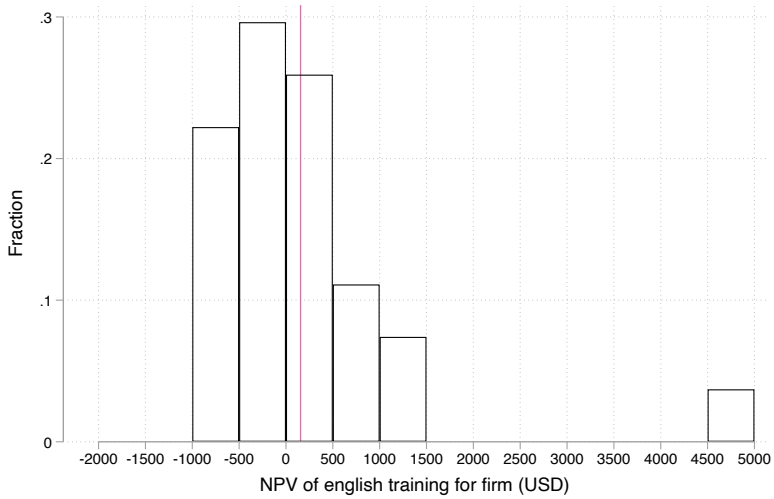
Figure C.7: Language Training NPVs

Panel A: DMs Distribution



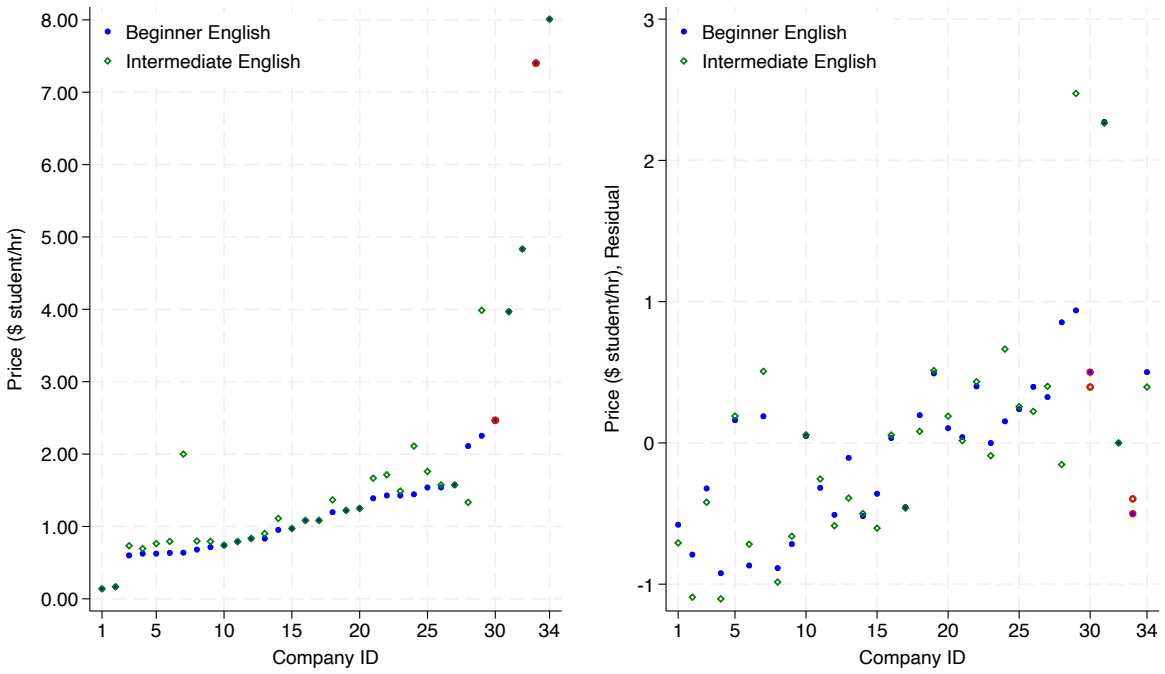
Notes: Figure plots the distribution of NPVs for the language training for each DM i: $NPV_i = \frac{1}{r}\Delta w - OC_i - C$. We set r, the monthly interest rate, to 1.2%. $\Delta w = \$3.6$ is the monthly wage increase expected based on the English proficiency gained from the language training: $0.15sd$ is the ITT effect; and, the returns to English from resume ratings (\$51.3 for going from elementary to advanced, a gap of about 2.2sd). So, $\Delta w = \$3.6 = \$51.3 \times 0.15 \div 2.2$. 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 (\$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 1.2%. 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 (\$300). The vertical bar is the average across all firms.

Figure C.8: Language Prices Across Providers



Notes: Figure on the left plots the average listed price per student per hour charged by English language training providers in Yangon. Figure on the right plots the average residualized price per student per hour from a regression of prices on location, a dummy if the provider has an ISO certification, a control for whether the provider exclusively employs native English speakers, local or both, a control for the source which we found the provider through and log number of students enrolled. Circled in red are providers which exclusively employ native English speakers.