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Migrants, Information, and Working Conditions in Bangladeshi Garment Factories

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January 31, 2018§

Abstract

A significant portion of the labor force in many large factories in developing countries consists of internal migrants from rural areas, who may have little information about the industry upon beginning work. We examine the relationship between workers' migration status and the working conditions they face in the garment industry in Bangladesh. We use a retrospective panel of the wages and working conditions of 991 garment workers (matched to the factories they work in) collected in 2009. We document that migrants are in firms with higher wages but worse working conditions, but as their careers progress, they have higher mobility than locals as they move toward firms with better conditions. These facts are consistent with a model in which migrants are poorly informed about working conditions upon beginning work but learn more as they gain experience in the industry.

Keywords: Migration, Imperfect Information, Labor, Turnover, Working Conditions, Safety, Garment Industry, Bangladesh

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1 Introduction

Firms are heterogeneous. Consequently, similar workers receive different compensation in different firms in both developed (Krueger and Summers 1988; Brown and Medoff 1989; Abowd, Kramarz and Margolis 1999) and developing (Teal 1996; El Badaoui, Strobl and Walsh 2008) countries. Indeed, this heterogeneity may be even greater in developing countries, where government interference and market imperfections prop up inefficient firms (Banerjee and Duflo, 2005). Minimal workplace safety regulations and other legal protections for workers further contribute to the between-firm variation in non-wage benefits. There is, however, little evidence documenting variation in wages or working conditions between firms in developing countries, or studying how workers are matched to these heterogeneous firms.

We examine this question in the garment industry in Bangladesh, where there has been substantial international attention to working conditions and wage levels. We develop a theoretical model in which firms compete for informed workers (who can observe working conditions upon beginning a job) and uninformed workers. The model illustrates how uninformed workers end up in firms with inefficiently low investments in working conditions – even in a competitive labor market – as firms compete for workers based on job aspects they can observe (wages) and not on those aspects they cannot observe (working conditions). We then extend the static model to a two period model to derive predictions on workers' mobility as they gain experience in the industry and presumably become better informed about working conditions. If there is a cost to switching factories, workers will do so only if they are sufficiently poorly matched to their current factories. In the context of this model, such workers are more likely to be uninformed workers, who move towards factories with better conditions, even if this improvement comes at the expense of lower wages.

In the context of this model, we consider several potential differences between internal migrants and local workers. Drawing on qualitative evidence that documents that many migrants know very little about the industry when they begin work, we first consider the possibility that they are precisely the workers in the model who are less likely to be informed about working conditions upon beginning work in the industry. However, we also consider several other potential hypotheses: migrants could have lower costs to moving factories, stronger relative preference for money over working conditions given the desire to send remittances home, or have lower average productivity than local workers.

We look for evidence of each of these possible differences between migrants and locals, using a retrospective panel of the work history of 991 garment workers collected from a

household survey of a peri-urban area outside Dhaka, Bangladesh in 2009. We combine workers' reports of problems in the factories, relationship between workers and management, and whether the factory provides medical care, and whether the worker has an appointment letter to create an index of working conditions. We compare the working conditions and wages faced by "local" workers originally from the same subdistricts as the survey area (who constitute 14 percent of workers in the sample) to those of internal migrants from rural areas.

We begin by considering differences in labor outcomes across the entire careers of migrants and locals, corresponding to the predictions of the one-period model. Migrants are in factories with an average of a 0.32 standard deviation lower index of working conditions than locals. This disparity is not due to observables demographic differences between migrants and locals, and holds when we compared migrants and locals in the same villages. At the same time, migrants are in factories that actually pay higher wages: the coefficient on migrant in a wage equation is significantly lower when factory fixed effects are included in the regression.

We then examine the model's implications for mobility of migrants versus locals as they gain experience. A discrete-time hazard model indicates that migrants are 1.1 percentage points more likely to leave a factory than locals. This difference disappears when we include factory fixed effects, suggesting that the differential mobility of migrants is driven entirely by the fact that they end up in the kinds of factories that people want to leave. Finally, we document that the migrants differentially improve their working conditions as they gain experience. The only model that these four key empirical facts are jointly consistent with is indeed the assumption that migrants are more likely to be uninformed upon beginning work in the industry.

There is relatively little literature on labor markets in export manufacturing sectors in developing countries, and most of its focus is on the determinants of wages, such as estimating export wage premia (see Harrison and Rodríguez-Clare (2010) for a review) or the effects of anti-sweatshop activism (Harrison and Scorse, 2010). Working conditions – especially subjective measures such as workers' relations with management – have received less attention, likely because collecting credible data is difficult. Even if a firm-level survey collected information, it is hard to imagine that respondents would truthfully report conditions when interviewed at the firm.[1] Some studies have examined working con-

[1] Tanaka (2015) is a notable exception. She collected data on fire safety procedures, health, and freedom of negotiation in garment factories in Myanmar, and demonstrates that the managers' reports of these measures were correlated with enumerators' observations during a factory tour. Still, her question of interest – how exporting affects working conditions – is different from our focus on the sorting of workers into different kinds of factories.

ditions by using injury or fatality reports at the industry level (Shanmugam 2001), but within-industry variance is likely important too. Indeed, Sorkin (2015) finds that nonpecuniary benefits are important in explaining variance in firm-level wages in the United States, and non-wage benefits could be even more important in developing countries given the general scarcity or weak enforcement of formal regulation. While our firm-level measures of working conditions from workers' reports in a household survey are likely imperfect as well – even in the privacy of their homes, workers may be be unwilling to report bad conditions – we nonetheless argue that these measures are the closest we can get to accurate reports of working conditions across firms with an industry.

The Bangladeshi garment industry in 2009 is a particular interesting context to examine working conditions in developing countries. The industry had been growing rapidly since the early 1980's, averaging 17 percent yearly employment growth. While NGO's had long been attempting to raise awareness of poor working conditions (see International Restructuring Education Network Europe (1990) for an early example), there was minimal government enforcement of safety standards, so compliance was largely voluntary, often encouraged by Western retailers (Mahmud and Kabeer 2003; Ahmed and Nathan 2014). While there have been recent higher-visibility initiatives in Bangladesh after the Rana Plaza collapse in 2013,[2] reports from other recent industrialized countries report similar lack of enforcement of regulations and resulting intra-industry variation in working conditions, including Robertson et al. (2009) in Indonesia, Oka (2010) in Cambodia, or Tanaka (2015) in Myanmar.

Since neither at the time – nor today – do there exist formal mechanisms to publicize the working conditions upon factories (to our knowledge), most workers relied on either their own experience or word of mouth to learn about factories upon beginning work (Amin et al. 1998; Absar 2009). Indeed, garment sector jobs can be thought of as "experience goods" whose quality cannot perfectly be observed before purchasing. While there is a long tradition in search models in labor economics of viewing jobs as experience goods (Jovanovic, 1979) in which nonpecuniary job characteristics could serve an important role (Viscusi, 1980), empirical tests of these models have focused on realizations over time of a worker's match-specific productivity (which neither the firm nor the worker knows at the time of hiring). This is in large part due to data limitations, as these productivity realizations would be likely to show up in a worker's wage trajectory with tenure, which is generally much easier to observe than working conditions.

[2]Namely, the The Bangladesh Accord on Fire and Building Safety and the Alliance for Bangladesh Worker Safety both work with factories to conduct audits and develop Corrective Action Plans to fix any violations found, including the potential for low interest loans to make these improvements.

By contrast, in our model, the firm knows its investment in working conditions, and would like to be able to credibly signal it to the worker. This is a similar context to industrial organization models in which firms know a good's quality but consumers do not. Theoretical models of this scenario have highlighted the potential efficiency gains of market intermediaries (Biglaiser, 1993) or sellers' ability to build a reputation (see Mailath and Samuelson (2013) for an overview). Given that we do not see Bangladeshi garment factories engaging in these types of efforts, a natural question is why they don't. While it is generally hard to spread information in the garment industry in Bangladesh – as previously mentioned, we know of no institutions that allow workers could share information about firms – our model suggests that labor market competition could be a further reason. In particular, if there is a constant stream of new workers, competitive labor markets lower the gains from establishing a reputation, since it is equally profitable to compete for uninformed workers than to invest in quality and then make costly efforts to advertise it.

Our emphasis on workers' informedness in hiring introduces a new concept to the literature on hiring in developing countries. The existing literature has highlighted factors that affect the workers' future productivity like skill complementarity (De Melo, 2009) or the availability of a network member to reduce moral hazard (Heath, 2011). Other work has emphasized the role of search frictions (Franklin et al., 2015) and the use of networks as a way of rationing desirable jobs (Wang, 2013) or spread information about job openings (Magruder, 2010). More closely related to this paper is Hardy and McCasland (2015), which focused on asymmetric information about workers' ability. Our focus, by contrast, is on asymmetric information about the job rather than the worker. Given how new an experience a garment factory job is to recent migrants, there is reason to believe that this asymmetry is also important in explaining labor market outcomes.

Finally, this paper contributes to the literature on rural to urban migration in developing countries. This literature goes back to the canonical models of Lewis (1954) and Harris and Todaro (1970), who argue that workers are on average more productive in urban than rural areas, so that rural to urban migration is a key driver of economic growth. Papers building on this theme have focused on the determinants of the decision to migrate to an urban area (Marchiori, Maystadt and Schumacher 2012; Bryan, Chowdhury and Mobarak 2014; Kleemans 2014; Henderson, Storeygard and Deichmann 2015) and the effect of migration on the migration household (Beegle, De Weerdt and Dercon 2011; de Brauw et al. 2013; Kinnan, Wang and Wang 2015) and the broader village economy (Morten 2013; Munshi and Rosenzweig 2016). Another strand of this literature examines the effects of internal migrants on wages and other outcomes in urban labor markets (Kleemans and Magruder 2015; Strobl and Valfort 2015). This paper brings these two strands of literature

together by examining how the characteristics of migrants affect their experience in urban labor markets.

2 Data and empirical setting

2.1 Survey and characteristics of respondents

The survey that yields the data we use in this paper was conducted by Rachel Heath and Mushfiq Mobarak between August and November, 2009. The survey consisted of sixty villages in four subdistricts (Savar and Dhamrai subdistricts in Dhaka district and Gazipur Sadar and Kaliakur in Gazipur district) in the peri-urban area surrounding Dhaka. The villages (shown in figure A1) were chosen randomly from three strata of data: 44 villages were chosen from among those considered to be within commuting distance of a garment factory (by an official at the Bangladesh Garment Manufacturers Exporting Association), 12 were chosen from not those considered to be within commuting distance, and 4 from the in between area (to allow the data to be representative at the subdistrict level).[3] The sampling unit was an extended family compound, called a *bari* in Bangla.

In addition to household-level information, each garment worker in a sampled bari filled out a questionnaire asking information about each factory they had worked in since they began working, including information about problems, relationship with management, and other factory characteristics (described more in detail in section 2.3). Workers were asked the name of each factory, so workers can be matched to other workers in the same factory to create factory-level measures of working conditions. Furthermore, workers were also asked if they ever earned a wage other than the first offer in a factory, and if so, the number of months they received each wage. We can thus construct a retrospective panel of the monthly wage of each worker since she began working, matched to the factory in which the wage was earned.

Several characteristics of the survey area are important in interpreting the results of the paper. First, these villages are near Dhaka, but not in Dhaka. This area was chosen because garment workers in these areas live in residential houses rather than dormitories, where factories tend to limit the access of outsiders and workers may feel less free to truthfully report characteristics of their job. Inasmuch as the typical worker in the survey area has fewer factories within commuting distance of her current residence than a

[3]These distinctions were very accurate in practice: of the 991 sampled workers, 976 were living in those designated as garment villages, 5 living in those designated as non-garment villages, and 20 living in "in between" villages.

worker in Dhaka, these workers may work in factories with greater monopsony power over their workers than factories in Dhaka. However, the fact that workers tend to move factories frequently – the average worker has worked in 2.3 factories (2.9 among workers in the industry for three years or more) – presents prima facie evidence against complete monopsony power of firms.

Another important characteristic of the firms in the sample is that they hire more males than the typical firm in Bangladesh: 56 percent of the workers in the survey are female, while the national labor force is estimated to be 80 percent female (Bangladesh Garment Manufacturing Exporters Association 2013; Saxena 2014).[4]. The garment factories in the survey area are disproportionately woven factories (compared to the national sample, which has a greater proportional share of knitwear factories). Woven factories, while still conducting the sewing activities that are overwhelmingly female, tend to hire more males to operate the looms, which require upper body strength to operate.

Table 1 gives summary statistics of the workers in our sample, broken down by gender and migration status. Because some of our sample began working before moving to their current village (and we don't know whether they were originally from that village or not), our main measure of migration status is not whether the worker is originally from the village in which she now resides. Instead, we consider whether the worker was originally from Dhaka or Gazipur districts (which incorporate all of the surveyed villages), which we refer to as urban areas, and the workers born there as "locals". Only 15 percent of male workers and 11 percent of female workers are locals, by this definition; we consider the rest of workers to be migrants.[5] The greater tendency of women to be migrants in unsurprising, given that women tend to migrate upon marriage in Bangladesh. These migrants were all born in Bangladesh, but come from all over the country. The largest sending district of Mymensingh, which neighbors Gazipur to the north, constitutes only 13 percent of migrants, and 44 home districts (of the 64 total in Bangladesh) are represented in two or more baris in the sample.

Both groups of workers overall are young (average age 27.9 years for males and 24.4 for females), although they are overwhelming married (79 percent of male workers and 76 percent of females). Male workers have approximately the same education (7.2 years) and experience (4.9 years) regardless of whether they are migrants; female migrants have

[4]Other sources put the figure at 90 percent female (Chowdhury and Ullah 2010; Ghosh 2014). Part of the disparity may be the question of whether only sewing-line operators (versus other factory employees) are included (Chris Woodruff, personal communication). This general lack of consensus highlights the general scarcity of detailed information about garment workers and factories.

[5]In the Appendix (Table A3), we show robustness of our main results to alternative definitions of the the migrant variable.

	Entire Sample		Migrants		Workers from Urban Areas		P-value of t-test, Migrants vs Urban	
	Males	Females	Males	Females	Males	Females	Males	Females
Panel A: Demographics								
Age	27.93	24.42	28.03	24.49	27.44	23.94	0.577	0.591
Years of Education	7.22	4.86	7.21	4.92	7.24	4.37	0.960	0.206
Years of Experience	4.92	3.57	4.86	3.45	5.26	4.53	0.447	0.014
Married	0.788	0.756	0.805	0.761	0.699	0.714	0.042	0.415
From Urban Area	0.167	0.114						
Originally From Surveyed Village	0.112	0.052	0.000	0.000	0.671	0.460	0.000	0.000
Years Living in Village (If not from Village)	4.21	4.41	4.46	4.49	2.97	3.84	0.040	0.339
Panel B: Socioeconomic Status								
House has Cement Floor	0.781	0.776	0.866	0.822	0.356	0.413	0.000	0.000
House has Electricity	0.966	0.955	0.986	0.969	0.863	0.841	0.000	0.000
Household has a Mobile Phone	0.774	0.673	0.756	0.657	0.863	0.794	0.046	0.030
Household Owns Current Residence	0.146	0.112	0.027	0.045	0.740	0.635	0.000	0.000
Household Owns Homestead	0.902	0.868	0.901	0.857	0.904	0.952	0.943	0.036
Household Owns Agricultural Land	0.553	0.476	0.589	0.494	0.370	0.333	0.001	0.016
Panel C: Job Characteristics								
Referred	0.347	0.317	0.311	0.311	0.528	0.367	0.000	0.380
Commute Time (Minutes)	19.13	19.13	17.56	18.17	26.99	26.90	0.000	0.000
Regular Hours	8.63	8.56	8.67	8.59	8.42	8.33	0.198	0.258
Average Daily Overtime in Peak Season	3.30	3.44	3.30	3.49	3.31	3.03	0.994	0.194
Tenure in Current Factory (Months)	27.22	26.89	24.90	25.70	38.85	36.18	0.000	0.015
N	438	553	365	490	73	63		

Table 1: Summary statistics

marginally more education (4.9 years, versus 4.4 years for locals, $P = 0.206$) but less experience (3.5 years, versus 4.5 years for locals). Both male and female workers migrants came to the village in which they were surveyed on average 4.5 years ago.

Panel B gives a sense of the living conditions of the workers in the sample. Garment workers are better off than the typical Bangladesh household in 2009 in several dimensions; they are likely to live in a house with a cement floor (78 percent of both genders), that has electricity (96 percent of both genders), and possesses a cell phone (77 percent of male workers and 67 percent of female workers). These averages mask substantial divides between urban and local workers: migrant workers are more likely to live in a house with a cement floor or that has electricity, but actually less likely to live in a house with a mobile phone. While only a small minority (4 percent) of migrants own the homes they currently live in, most own a homestead (presumably, in their original village) and around half own agricultural land as well. By contrast, most urban workers own the homes they live in, but are less likely to own agricultural land.

Finally, panel C describes the job characteristics of migrants and local workers. Local male workers were considerably more likely than local workers to have been referred (53 percent of local workers; 37 percent of migrants), whereas 31 percent of both groups of female workers were referred. Local workers tend to have longer commutes; both males and female commute an average of 27 minutes, compared to approximately 18 minutes for male and female migrants. Both genders and migrants groups work on a regular day an average of approximately 8.5 hours and average about 3 hours of overtime in the peak season. Workers from urban areas have a longer tenure with the current firm, 39 months for males and 36 months for females, compared to 25 months for male migrants and 26 months for female migrants.

Overall, while the discussion we have just made highlights several reasons why the workers in the sample are not necessarily representative of workers throughout garment industry in Bangladesh, we posit that this is an important sample in its own right. For one, the workers are heavily migrants, which is a common characteristics of workers through the industry. So any disadvantages endured by migrants probably highlight a common problem throughout the industry. Secondly, the higher than usual proportion of males in the sample gives us power to detect gender differences in outcomes, which could potentially be important in understanding the overall labor market outcomes in Bangladesh.

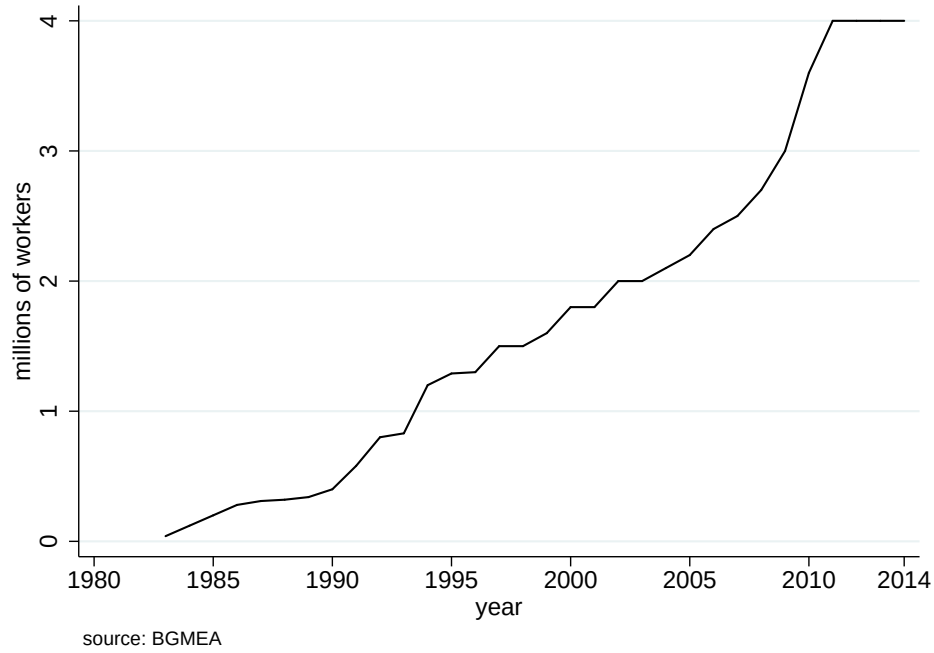

Figure 1: Garment sector employment

2.2 The garment industry in Bangladesh

Figure 1 depicts the consistent employment growth in the garment industry between the early 1980's and the 2009 survey; the average yearly employment growth over that period is 17 percent (BGMEA 2013). The high rates of migration in the surveyed villages displayed in table 1 are emblematic of the general rates of rural to urban migration that have accompanied the rapid growth of the garment sector. Thus, many workers tend to enter the industry with no experience in the formal sector, and little experience outside the home or village at all.

As is explained more in detail in Heath (2011) – which uses the same dataset as this paper – hiring is relatively informal. It is common for the firm hiring a worker to receive a referral from one of their current workers (such referrals constitute 32 percent of hires); other workers find out about the job through a personal contact not working in the factory that is hiring (8 percent of hires). It is also common to show up at the factory and ask for work (40 percent of hires). Only 19 percent of workers are hired through more formal means (a written advertisement or recruitment by management). The fact that most hiring is done informally again suggests that workers may know little about a factory when they begin working.

There is anecdotal evidence that the factories these workers enter are quite heterogeneous, both in wages and in working conditions. At the time of the 2009 survey, the minimum wage was 1662.5 taka per month (about 22 US dollars at the time). While the minimum wage did bind in some factories (Heath, 2011), others paid substantially more.[6]

Other sources also highlight that there have historically been – and continue even in light of the initiatives to improve safety after the Rana Plaza collapse – wide variation in working conditions across factories. One of the Post-Rana Plaza initiatives of Western retailers conducted building safety audits of 279 exporting factories in the commuting zone for workers in our sample. The audits reveal significant variation in compliance with the initiative's building safety requirements even among 100% export-oriented establishments: Factories ranged from complying with fewer than half of requirements to about 85% of requirements (mean compliance was 63%, with a standard deviation of 7.4%). Appendix B provides more information about the building safety audits. Interviews Heath conducted with industry officials also underscore the difference between highly visible factories and more "shadowy" factories who try to evade detection from government inspectors and NGO watchdogs. This was relatively easy at the time of the survey (before post Rana Plaza reforms), given that government inspectors were frequently outmanned. For instance, the European Commission (2014) reports that before Rana Plaza, the Department of Inspection for Factories and Establishments had 76 inspectors for 5000 factories. A private audit market sprung up as retailers sought to reassure their customers they were avoiding unsafe factories, but the results of these audits were rarely transparent, there were accusations of bribery, and even when safety violations were documented there was no mechanism in place to force factories to address the violations (Clifford and Greenhouse, 2013).

2.3 Identifying firms with good working conditions

We use workers' reports of problems in the workplace, the relationship between workers and management, and services available to measure working conditions in each factory that she or he has worked in. Table 2 lists these variables specifically. While the unit of observation in the empirical analysis is generally the worker-month level (so that the left column corresponds to the variation we use in the analysis), we also provide the rates of each outcome at the worker-factory level and in the worker's current factory to show

[6] In negotiations after the Rana Plaza collapse in 2013, the minimum wage was raised to 5300 taka. While we know of no systematic wage data collected after this hike, anecdotal evidence from conversations from Heath's trip to Dhaka in December 2014 suggest that there is indeed now less variation between factories in wage levels.

	All worker-month observations	All worker-factory spells	In current factory
Problems Listed			
hours too long	0.078	0.094	0.060
abusive management	0.033	0.037	0.021
bad/unsafe working conditions	0.009	0.013	0.009
not paid on time	0.059	0.071	0.030
unpaid overtime	0.019	0.024	0.017
fired for sickness	0.017	0.019	0.005
other	0.017	0.024	0.009
Relations with management (worst is "Very Bad")			
"Bad" or better	0.996	0.996	1.000
"Okay" or better	0.970	0.966	0.981
"Good" or better	0.822	0.800	0.830
Excellent	0.154	0.093	0.111
Other proxies			
appointment letter	0.376	0.281	0.345
provide medical care	0.711	0.642	0.753
N	48,687	2,267	991

Table 2: Components of the Working Conditions Index

how the weighting by time in the factory affects the reporting of conditions and how the conditions on average evolve over a worker's career. Specifically, the problems that we use to construct the index were: hours too long (8.2 percent of monthly observations), abusive management (3.2 percent), bad/unsafe working condition (0.8 percent), not paid on time (5.8 percent), unpaid overtime (1.9 percent), fired for sickness (1.7 percent), and "other" (1.6 percent). Note that the reports of problems are somewhat lower in the current factory.[7] Problems were more common when reported at the worker-spell level than the

[7]It is possible that any underreporting in overall measures of working conditions is more severe in their current factory if workers fear retaliation if management hears about their responses. While there were no reports from enumerators of workers expressing concern about whether the responses would actually be kept private, we also show in section 5.1 that the key results on working conditions remain if we discard a respondent's report in her current factory.

worker-month level, suggesting that workers spend less time in factories when there are problems present.

We also use a worker's categorical response to the question, "Overall, during your time in this factory, did you feel you had good relations with the management?"; options were excellent, very good, good, bad, or very bad. The modal response, given in 67.0 percent of worker-months, was "good". Finally, we use information on whether the factory provides medical care for ill workers (70.5 percent of worker-months) and whether the worker received an appointment letter (37.4 percent of worker-months). Appointment letters lay out the details of employment (such as salary) and say that the worker cannot be dismissed without cause.

We assume that these variables all reflect a single index of firm-level working conditions, independent from the mean wages. For instance, problems in the relationship with the management could reflect management's response to workers' complaints about working conditions. If workers are risk averse, then they also value the stability afforded by appointment letters. Relatedly, while some of the problems relate to wages (late payment or unpaid overtime), they would not be reflected in the base wage but lower the utility the worker gets from a baseline salary by increasing the uncertainty in that salary or decreasing the de facto hourly wage.

Specifically, we construct a working conditions index variable using the scores on the first principal component of the matrix of working condition variables. Call this variable $\hat{c}_f$. We recoded the variables reporting problems to reflect lack of a particular problem, so that higher values indicate more favorable conditions and we created a series of mutually exclusive binary indicators from the categorical variable representing a worker's relationship with management. Accordingly, higher values in our index correspond to better working conditions. This interpretation is not always valid with principal components, even if variables are coded to have the same direction. In our case, however, all variables have the same sign for the loading on the first component. To ensure that this interpretation is robust, we also implemented a non-negative principal components procedure (Sigg and Buhmann, 2008, Sigg and Sigg, 2014) and found no substantive (and only minimal numerical) differences. Since all variables are binary, we also implemented non-linear PCA (Gifi, 1981, De Leeuw and Mair, 2007) and again found no substantive differences in our results.

In interpreting this index, we also assume that conditions do not change in response to workers' characteristics, so that workers sort based on fixed characteristics of factories, rather than factories offering different conditions to individual workers. We address this concern in several ways. First, in our empirical analysis of worker-level character-

istics and working conditions in section 5.1, we show that our results persist when we reconstruct measures of working conditions that do not use a worker's own report.

Second, the possibility that conditions are endogenous to worker-level characteristics may be a particular concern with appointment letters. While there is anecdotal evidence that the decision to offer appointment letters is made at the factory level (the Labour Law of 2006 required them, and before that, it was considered a characteristic of responsible factories), it is possible that some factories offer appointment letters to only their valued workers. Then the interpretation of the relationship between variation in factory quality from appointment letters and a worker-level characteristic such as migration status would reflect the value employers place on this characteristic rather than differences in how workers sort in factories based on working conditions. Accordingly, in section 5.1 we also show that our results are robust to removing the indicator for an appointment letter.

Figure 2 shows the estimated distribution in working conditions. The top panel shows the distribution of workers per factory. While the majority of factories in the data have only one worker appear – this is unsurprising, given that this includes any factory in which a sampled worker ever worked, even if they were living in another location – there is a large absolute number of factories with multiple workers in the sample, which is important for our empirical specifications that include wages and firm fixed effects. The bottom panel shows the distribution of working conditions. The long left tail shows that the worst factories tend to have many problems.

3 Model

In this section, we characterize a model of worker's decisions of initial firms and subsequent if they are informed about working conditions when beginning work versus if they are not. We then characterize the model's predictions on the labor outcomes of migrants, versus locals, under several plausible assumptions about the differences between migrants and locals. For one, migrants could precisely be the workers who are more likely to be informed. However, we also consider the possibility that migrants have lower mobility costs, greater relative preference for wages over working conditions, and migrants are lower productivity. Only the assumption that migrants are less likely to be informed (but this difference fades with experience) generates the entire set of empirical predictions that we find in section 5: migrants are in factories with higher wages but worse working conditions; as they gain experience, they move more than locals and differentially improve their working conditions. Section 4 then shows that the main intuition

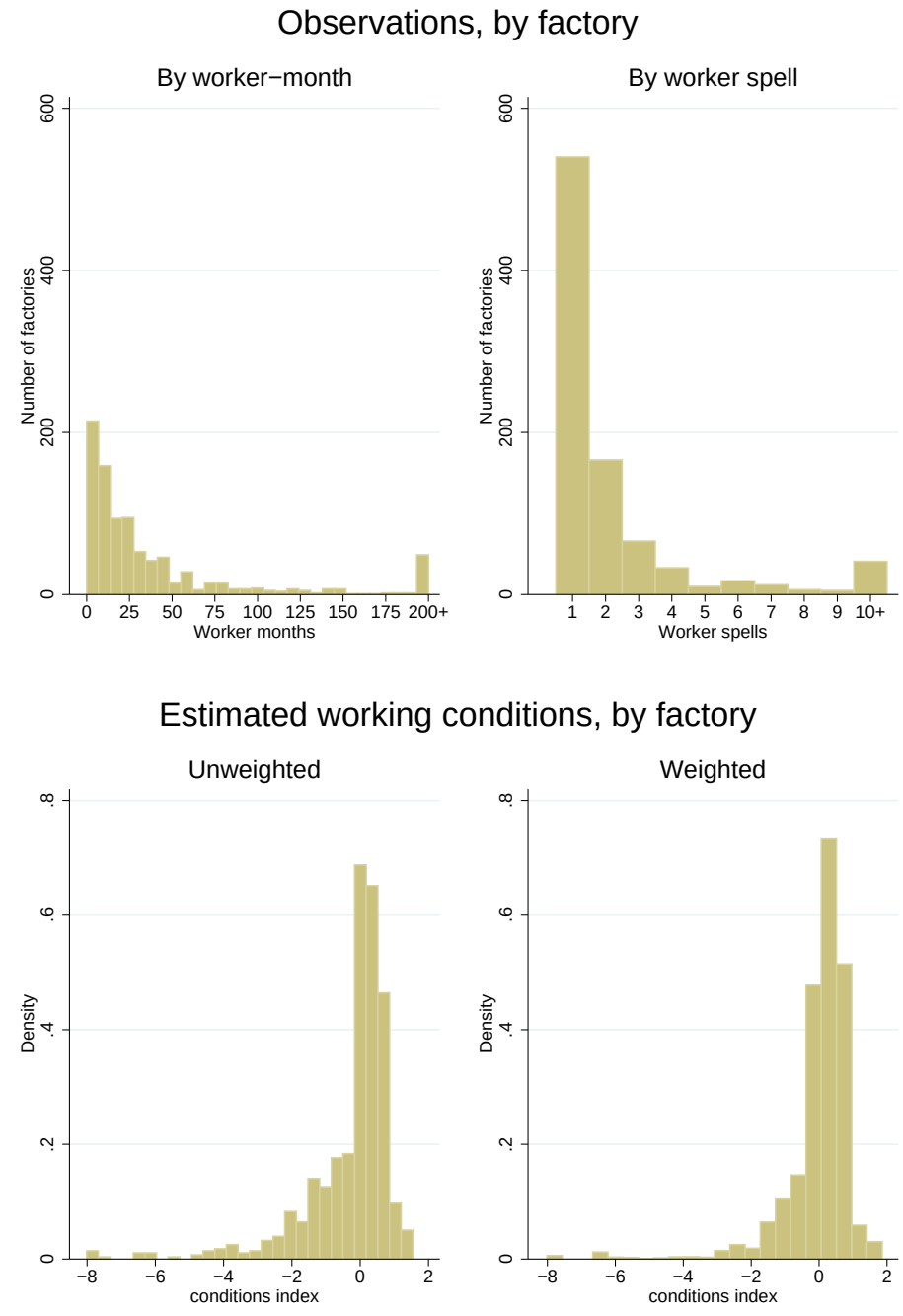

Figure 2: Factory-level variation in working conditions

and predictions of the model persist when we consider several extensions: considering workers' participation decisions, allowing labor markets to be imperfectly competitive, and allowing for vertical productivity differentiation.

3.1 Set-up and baseline results

Workers have marginal revenue product π. They get utility from wages (w) and working conditions (c). Utility is separable in wages and working conditions:[8]

$$u(w,c) = u_w(w) + \beta u_c(c)$$

Some workers observe the working conditions in a firm but others cannot.[9] Firms can pay a per-unit cost of p to improve conditions. Labor markets are competitive, so firms bid the total offer up to the workers' perceived utility.[10] That is, they offer $(\pi, 0)$ to uninformed workers, and to informed workers they offer the (w,c) pair that solves:

$$\begin{aligned} max \quad & u_w(w) + \beta u_c(c) \\ w,b & \\ s.t. \quad & w + pc = \pi \\ FOC: \quad & u'_w(w) = \frac{\beta}{p} u'_c(\frac{\pi - w}{p}) \end{aligned} \tag{1}$$

[8] If we relax this assumption – say, the marginal utility of wages could be higher with worse conditions – then there could be firm-level differences in working conditions even without heterogeneity in workers' level of informedness, since workers' utility could either be maximized with a (high wage, low conditions) offer or a (low wage, good conditions) offer. However, absent an additional assumption on migrants versus locals – such as the level of informedness – nonseparability alone wouldn't generate the same pattern of sorting across the firms we see in the data. Do note though that nonseparability would lower the utility loss from the model's predictions on uninformedness and thus attenuate the testable implications of the model that stem from previously uninformed workers taking steps to find firms that are better matches, since the uninformed workers would at least value the additional wages that the low-conditions firm is paying them.

[9] There is a close parallel to the IO-behavioral literature on shrouded attributes (Gabaix and Laibson, 2006), in which some consumers are Bayesian updaters who infer that hidden attributes of a product are highly priced, whereas "unaware" or myopic consumers do not. These uninformed workers would then represent the unaware consumers in their model. Our theory also parallels Gabaix and Laibson (2006) in demonstrating that competition need not necessarily induce firms to reveal information.

[10] So the uninformed workers' prior is key, since they will infer conditions based on the wage offer they get. In a perfect Bayesian equilibrium where workers know π, they will infer that firms with higher wages can only afford to do so because the conditions are bad. So our assumption that they do not do this is undoubtedly strong, but we think it is reasonable given just how little migrants typically know when first looking for work in a garment factory.

The FOC indicates that firms offer a level of conditions to informed workers that equates the marginal value of wages with the marginal gains from better conditions, scaled by the cost of improving conditions. Assume that conditions must be the same for every worker in a firm, so that firms will either specialize in informed or uniformed workers.[11]

Now consider a second period in which previously uninformed workers can now observe working conditions. All workers can choose to switch firms, but would have to pay a mobility cost $m \sim U[0, \bar{m}]$ to do so. So they will switch if they get an offer (w', c') such that

$$u(w', c') - m \geq u(w, c) \tag{2}$$

Note that informed workers have no reason to switch firms, since they are already receiving the wage offer that would maximize their utility.[12]

3.2 How are migrants different?

There are several potential ways in which (internal) migrants could differ from locals in the above model. We list several possibilities and explain the results that would ensue if each was incorporated into the model.

3.2.1 Migrants are more likely to be uninformed

In the model, workers who are uninformed about working conditions will end up in firms with worse conditions but higher wages. There is indeed reason to believe migrants are less informed than local workers upon beginning work. There is little information about firms in print, so workers tend to rely on word of mouth. Indeed, qualitative evidence has documented that migrants typically know very little about the garment industry overall upon arrival in an urban or peri-urban area, much less about individual firms (Absar, 2009). In the extreme, there are anecdotal reports of unscrupulous factories issuing attendance cards without names to newly hired workers so that the workers have no recourse to collect unpaid overtime (Ahmed, 2006). Indeed, in our data, table 1 demonstrates that migrants are less likely to have received a referral in their current position, and even conditional on receiving a referral, they are less likely to know more than one worker in

[11] If there are economies of scale in improving conditions, the model would imply that large firms are more likely to specialize in conditions and thus would attract more native workers. So they would then pay lower wages, unless there are firm-level differences in productivity that would imply that more productive firms grow bigger and also pay higher wages.

[12] And even if there are idiosyncratic taste shocks to working in a specific firm that would lead informed workers to switch firms, the uninformed workers would still switch more often unless somehow they receive fewer of these idiosyncratic shocks.

the firm (48 percent of referred local workers knew at least one other worker in the firm, compared to 36 percent of referred migrants, $P = 0.089$).

Further predictions on migrants will result if the difference in informedness fades with experience in the industry. In the context of the model, assume that all workers can observe working conditions in the second period. Since migrants started off in firms with worse conditions, it is more likely to be worthwhile to pay a cost to move in order to seek out a firm with a preferable balance between conditions in wages. So migrants are more likely to move factories and improve their working conditions with time in the industry than locals, while locals improve their wages more: $\Delta c_{migrant} > \Delta c_{local}$. So migrants' working conditions will improve with time in the industry more than local workers.

3.2.2 Migrants have lower mobility costs

Another possible difference between migrants and locals is that migrants have lower mobility costs ($\bar{m}_m < \bar{m}_l$), since they have less of a network in any one particular area or factory. If so, then the prediction the migrants have higher mobility that we earlier derived from the assumption that migrants are less likely to be informed upon beginning work could just be because it is easier for migrants to move. However, it would then be easier all along for migrants to seek out factories with good conditions, so they would be in factories with better conditions than locals, whereas locals would be the ones in factories with higher wages.

3.2.3 Migrants have greater relative preference for wages over conditions

Another potential explanation for why migrants are in factories with worse conditions is that they can actually observe working conditions, but they have a higher relative preference for wages over working conditions than do locals ($\beta_m < \beta_l$). For example, if migrants prefer living in their home villages, they would hope to send home a lot of money quickly, even at the risk of their safety or comfort. If so, they would make perfectly well-informed choices to be in firms with worse working conditions but higher wages. But then, if anything, when they move, they would seek out firms with even higher wages (and worse conditions), compared to locals. And this assumption generates the opposite prediction as would the assumption of differences in informedness: the conditions faced by migrants would actually worsen with experience in the industry, compared to those faced by natives.

3.2.4 Migrants are lower productivity

Finally, there could be differences in average productivity (π) between locals and migrants who choose to enter – and stay in – the garment industry. The difference could go in either direction: migrants could be lower productivity due to worse education or experience with modern technology, or they could be higher productivity given positive selection of migrants. If they are lower productivity, this could explain why they are in factories with worse conditions, but not why they are actually in factories with higher wages. By extension, if they are higher productivity, it is hard to explain why they are in firms with worse working conditions.

3.3 Summary of testable implications of different assumptions about migrants

Table 3 summarizes the predictions of each of the potential differences between migrants and locals described in section 3.2. There are many reasons why migrants would be in factories with worse working conditions than locals, including the possibility that they knowingly chose that option because these factories pay higher wages. However, the fact that after they begin working they differentially move towards better conditions than do locals suggests that they actually do have a preference for better conditions and begin trying to improve their conditions as they learn about the variance of working conditions between firms.

It is possible that several of the potential differences between migrants and locals are present simultaneously. If so, then a finding in line with any given assumption suggests that that particular difference is the strongest. For instance, migrants could be both more poorly informed about conditions and have a higher desire for money over conditions. In this case, a finding that migrants move towards better conditions with time would imply that the difference in informedness (that fades with time) is stronger than migrants' preference for money over conditions, which would (ceteris paribus) tend to say they move towards factories with worse conditions over time compared to locals, who are the ones seeking better conditions in that model.

	Migrants in Factories with		Migrants	
	Worse Conditions	Higher Wages	Higher Mobility	$\Delta c_m > \Delta c_l$
More likely to be uninformed about conditions				
time invariant	✓	✓		
which fades over time	✓	✓	✓	✓
Lower mobility costs ($\bar{m}_m < \bar{m}_l$)	(opposite)	(opposite)	✓	✓
Greater relative preference for wages ($\beta_m < \beta_l$)	✓	✓	(opposite)	(opposite)
Lower productivity ($\pi_m < \pi_l$)	✓	(opposite)		

Note: the predictions of each row in the table assume that the given assumption is the only difference between migrants and locals. For instance, the first two rows assume that migrants are more likely to be uninformed, but have the same mobility costs, preferences, and productivity as locals.

Table 3: Summary of testable implications of different assumptions about migrants

4 Extensions

4.1 Building in a participation constraint

It is useful to incorporate reservation utility both because it is another potential difference between migrants and locals and to help interpret the retrospective nature of the data. Without variation in workers' productivity (or other unobserved differences between workers), the possibility that workers drop out if their wage offer is below a reservation wage will not fundamentally change the model, since there would be no selection on unobserved characteristics. However, suppose that there is variation in workers' marginal revenue product so that $\pi \sim N(\mu_\pi, \sigma_\pi^2)$. Since predictions on the change in a worker's wages, working conditions, or mobility between firms can be tested among workers whose utility is above reservation in both periods, the relationship between π and the outside option (are better or worse workers more likely to leave the industry?) determines whether the predictions are tested on a group of relatively high or low productivity workers. However, the fundamental predictions of the model – namely, the comparisons between migrants and locals – should still persist in the sample of stayers.

Differences in reservation utility between migrants and locals could, by contrast, generate differences between migrants and locals who stay in the labor market in consecutive periods. Migrants could have a lower reservation utility if they are less aware of non-garment job opportunities in the area, or if their job opportunities at home are inferior. They would thus be more likely to remain in the industry after a bad (w, c) offer than locals. As with the possibility that migrants are low productivity, this could explain why they are in factories with worse conditions, but not why they are actually in factories with higher wages.

4.2 Imperfectly competitive labor markets

While the baseline model assumes that firms bid wages up to workers' perceived utility, firms may have some market power in the labor markets in which they operate. However, building this into the model will not substantively change the main predictions as long as the firm's problem is separable in the total compensation they offer workers and the division of this compensation between wages and investments in working conditions. If so, then the main model applies with a total compensation of $\tilde{\pi} < \pi$. For example, consider the opposite extreme from a competitive labor market: the firm has all the bargaining power and thus makes a take-it-or-leave-it offer to the worker. In this case $\tilde{\pi}$ would equal the worker's reservation utility, but again it would still consist of relatively higher wages

and lower conditions for the uninformed workers.

4.3 Firm-level variation in productivity

Suppose firms vary in productivity, so that workers with the same ability have different marginal revenue product in different firms. These differences could either be permanent (say, due to variation in managerial ability), or temporary (the firm got a big order that it needs to fill).

We first consider permanent differences in productivity between firms. In the extreme, the dispersion across firms is entirely vertical (so that there are no firms with similar marginal revenue products competing for workers). If so, then firms will set total compensation with monopsony power (as described in the previous subsection), and the division of this total compensation between wages and investment in working conditions will depend on the relative number of informed and uninformed workers, as in the baseline model. Similarly, if there is both horizontal and vertical differentiation, the baseline model would still apply within a certain tier of firm.

However, note that if the matching into firms of different tiers is driven at least in part by search frictions (rather than positive assortative matching), this extension can generate the higher mobility of migrants under the assumption that migrants have greater relative preference for wages ($\beta_m > \beta_l$). Migrants would be more willing to pay a mobility cost to move to a higher productivity firm than locals. Note, however, that this prediction that migrants have higher mobility is not unambiguous: it is now the locals who are trying to move in order to seek out better conditions. So the relative variance in conditions versus wages would determine whether the migrants or locals are more likely to move.

Next, consider the possibility that, due to demand shocks, the worker's marginal revenue product in a specific firm increases at a certain time. If so, then after receiving the positive shock, the firm would increase compensation to entice them to move there, and workers who move are likely to end up in the firms with positive demand shocks. If migrants have lower mobility costs, while they particularly want to improve their conditions upon moving, if the demand shock is sufficiently large, they would also improve their wages, which would generate a channel through which migrants earn more with experience.

These extensions are particularly relevant because both can generate a countervailing prediction from that of the baseline model on the wage trajectory of migrants with experience. That is, while the baseline model predicts that migrants should earn less with experience relative to natives, these extensions predict that migrants should earn

more, and thus make the net prediction ambiguous. This is particularly true in the case of temporary shocks, under the assumption that it takes more time for firms to improve working conditions than to increase wages. If so, they will attract workers entirely by paying more. Then, while the migrants are really searching for better conditions, if two firms hiring have similar conditions, they will still go to the one paying more.

5 Empirical strategy and results

In this section we explain how we test the results of the model's predictions on the factory level working conditions and wages, and the mobility of migrants versus natives, in the context of the retrospective panel.

5.1 Firm-level working conditions

We begin by establishing the differences in the working conditions of migrants versus locals, across their experience in the industry. We thus estimate a regression that examines the factory-level working conditions $\hat{c}_{ift}$ faced by worker i in factory f at time t as a function of whether that worker is a migrant, and other worker-level characteristics (experience, education, gender) assembled in the variable X_{ift}:

$$\hat{c}_{ift} = \beta Migrant_i + \gamma' X_{ift} + \varepsilon_{ift} \tag{3}$$

Table 4 gives the estimation results. We standardize the outcome variable to have mean zero and standard deviation one, so the coefficient on *Migrant* in the first column indicates that migrants are in factories with on average of a 0.30 standard deviations lower working conditions than locals. The second column shows that this effect is not due to differences in experience, education, or gender between migrants and locals; the coefficient on *Migrant* remains unchanged with these controls.

The third through six columns focus only on the current observation for each worker to allow for the inclusion of village fixed effects (since we only know the current village of residence of each worker). This sample also facilitate interpretation by focusing only on one observation per worker. The coefficients get smaller when only the current observation is used, as would be expected if migrant workers are differentially moving towards better conditions over time. Still, however, there is a marginally statistically significant difference between the current working conditions of migrants and locals (columns 3 and 4), and columns 5 and 6 show that these differences if anything get stronger when village

fixed effects are included: at the time of the survey, migrants were in factories that had 0.20 standard deviations lower measured working conditions than locals in the same village. So there is no evidence that the tendency for migrants to be in factories with worse conditions is driven by residential sorting of migrants into areas in which the factories have worse conditions.

The relationship between working conditions and migration is far stronger than the relationship between other worker-level characteristics (namely, experience, education, and gender). Returning to Table 4, in the sample that includes past observations (column 2), each year of education is associated with a 0.029 standard deviation increase in working conditions. Male workers are also in factories with an average of 0.11 standard deviations worse working conditions than females, although this is effect is not significant at conventional levels. Both effects also disappear in the current sample of workers, and in neither the full nor current sample is there a relationship between experience and working conditions.

In the Appendix, we implement several tests of the robustness of the results in Table 4. First, Table A1 demonstrates their robustness to several important alternate constructions of the working conditions index.[13] Columns (1) and (2) show that the migrants are in factories that are 0.25 standard deviations lower quality when the index does not include appointment letters. While the slightly lower point estimate does suggest that the some of the relationship between migrants and working conditions is indeed driven by their lower rate of receiving appointment letters, the fact that the coefficient is still large and statistically significant does suggest that the other variables – which more obviously correspond to the entire factory – drive the majority of the relationship. Columns (3) and (4) provide further reassurance that migrants' tendency to face worse conditions within a factory does not drive their tendency to face worse working conditions; there is an almost identical relationship between migrants and working conditions if we reconstruct the measure of working conditions leaving out the worker's current report. Finally, columns (5) and (6) reconstruct the measure of working conditions leaving out workers' reports from their current factories. If workers are more hesitant to report worse working conditions in their current factory – and differential sorting of workers into factories over time interacts with migration – then it is theoretically possible that this underreporting could driven some of the estimated relationship between migration and working conditions. However, the coefficient if anything increases in magnitude, suggesting that any

[13] We only display the first two columns, both for brevity and also in light of the fact that the result that consider only the worker's current factory are harder to interpret when we construct a measure of working conditions that throws away reports from precisely this current factory.

differential reporting in the current factory does not drive the estimated migration effect.

Next, table A2 compares working conditions reported by workers at the same factory. In this analysis, the index of working conditions is standardized across all worker-month observations, as opposed to across all factory-month observations. The table shows that migrants and non-migrants working at the same factory report facing similar conditions. This result is important because it shows that the gap in working conditions faced by non-migrants and migrants closes inside the factory. It is also another demonstration that migrants and non-migrants do not systematically report facing different conditions at the same factories.

Finally, table A3 shows the robustness of the results to alternate definitions of the migrant variable. The point estimates vary with how strictly the migrant variable is defined, but the results support the main results.

	Dependent Variable = Index of working conditions ($\hat{c}_{ift}$)					
	(1)	(2)	(3)	(4)	(5)	(6)
Migrant	-0.3017***	-0.3214***	-0.1871*	-0.1964*	-0.2028***	-0.2021***
	[0.087]	[0.097]	[0.101]	[0.102]	[0.058]	[0.063]
Male		-0.1056		0.0378		0.0591
		[0.094]		[0.072]		[0.064]
Education (Years)		0.0287*		0.0091		0.0080
		[0.015]		[0.009]		[0.009]
Experience (Years)		-0.0068		0.0077		0.0092
		[0.024]		[0.009]		[0.008]
Past observations	Yes	Yes	No	No	No	No
Village fixed effects	No	No	No	No	Yes	Yes
Observations	49,276	49,210	962	959	962	959
R-squared	0.012	0.021	0.007	0.013	0.177	0.186

*Notes: The index of working conditions is described in section 2.4; it is standardized to have mean 0 and standard deviation 1. Migrant = 1 if the individual is was not born in Gazipur or Dhaka districts, as described in section 2.1. "Past observations" refer to any month in which they worker has been in the garment industry since she began working, constructed using the retrospective panel structure of the data, as described in section 2.1. In columns 1 and 2, standard errors clustered at the level of the individual. In columns 3-6, standard errors clustered at the level of the village. *** p<0.01, ** p<0.05, * p<0.1.*

Table 4: The relationship between worker-level characteristics and factory-level working conditions

5.2 Firm-level wages

We next test the model's prediction on the average wages of factories with and without migrants. To do this, we compare the coefficient on *Migrant* in a wage regression with and without firm fixed effects:

$$log(w_{ift}) = \beta_{ols} Migrant_i + \gamma' X_{ift} + \varepsilon_{ift} \tag{4}$$

$$log(w_{ift}) = \delta_f + \beta_{fe} Migrant_i + \gamma' X_{ift} + \varepsilon_{ift} \tag{5}$$

Table 5 gives the coefficients on *Migrant* and the other worker-level characteristics in regressions with and without firm fixed effects. Over the course of their careers, migrants earn 4.9 percent more than local workers with the same characteristics, and surveyed

migrants were currently earning 8.1 percent more than locals, although neither effect is statistically significant at conventional levels. However, in both cases the coefficient on migrant flips sign when factory fixed effects are added.[14] Indeed, the fact that the coefficients are statistically different from each other confirms that migrants are indeed in firms with higher wages. Educated workers are also in higher-paying firms, but male workers are not. The returns to experience become less concave with firm fixed effects, suggesting that part of the diminishing returns to experience is driven by the sorting of workers across firms.

	Dependent Variable = Log wage					
	(1)	(2)	P-value of test BetaFE = BetaOLS	(3)	(4)	P-value of test BetaFE = BetaOLS
Migrant	0.0490	-0.0155	0.0769	0.0806	-0.0436	0.002
	[0.043]	[0.048]		[0.051]	[0.071]	
Male	0.2103***	0.2255***	0.6057	0.2242***	0.2090***	0.571
	[0.034]	[0.032]		[0.029]	[0.039]	
Education	0.0377***	0.0289***	0.0380	0.0272***	0.0208***	0.162
	[0.005]	[0.005]		[0.005]	[0.006]	
Experience	0.1313***	0.1069***	0.0001	0.1100***	0.0986***	0.270
	[0.006]	[0.007]		[0.009]	[0.012]	
Experience squared	-0.0055***	-0.0042***	0.0004	-0.0040***	-0.0032***	0.141
	[0.000]	[0.000]		[0.001]	[0.000]	
Past wages	Yes	Yes		No	No	
Factory fixed effects	No	Yes		No	Yes	
Observations	46,847	46,847		877	877	
R-squared	0.313	0.642		0.361	0.743	

*Notes: Wage expressed in 2009 taka. Migrant = 1 if the individual is was not born in Gazipur or Dhaka districts, as described in section 2.1. Education and experience measured in years. Standard errors clustered at the level of the individual in columns 1 and 2 and the level of the factory in columns 3 and 4. *** p<0.01, ** p<0.05, * p<0.1.*

Table 5: The effect of factory fixed effects on coefficients in a wage regression

[14] This negative within-firm coefficient on migrant suggests that in the context of the discussion in section 3.2.4, if anything, migrants are lower average productivity, unless there is a non-productivity-based reason that migrants earn less than others in the same firm (such as lower bargaining power in a noncompetitive labor market).

5.3 Mobility

The next set of predictions relate to differential mobility of migrants versus locals as they begin to observe working conditions and reoptimize accordingly. Firstly, migrants will have higher mobility than locals. We test this with a discrete-time hazard model, where the outcome is one in months where a worker leaves a factory for another factory and zero in months in which a worker remains in the factory.

$$1(Leave)_{ift} = \beta Migrant_i + \gamma' X_{ift} + \varepsilon_{ift} \tag{6}$$

Table 6 gives these results. We report average marginal effects from a logit specification. The first column indicates that migrants are 1.4 percentage points more likely to leave one factory for another in a given month than locals; this is a very large effect relative to the average mobility rate of 2.6 percent per month. The second column shows that firm fixed effects decrease the magnitude of the migration coefficient to 0.64 percentage points, which is no longer significant at traditional levels ($P = 0.173$). This is consistent with the model in the sense that migrants do not have higher mobility per se, rather, they are more likely to end up in factories that are worth paying a mobility cost to leave.

Dependent Variable = 1(Leave)		
	(1)	(2)
Migrant	0.0137***	0.0064
	[0.0030]	[0.0047]
Experience	-0.0008***	-0.0015**
	[0.0003]	[0.0006]
Education	0.0005*	0.0018***
	[0.0002]	[0.0004]
Male	0.0069***	-0.0001
	[0.0019]	[0.0031]
Tenure in Firm	-0.0032***	0.0057***
	[0.0006]	[0.0009]
Factory fixed effects	No	Yes
Observations	48,197	48,197

*Notes: Leave = 1 if the worker left the factory in a particular month and switched to another factory, also in the garment industry. Coefficients are average marginal effects from logit regressions. Migrant = 1 if the individual is was not born in Gazipur or Dhaka districts, as described in section 2.1. Experience, education, and tenure measured in years. Standard errors clustered at the level of the individual. *** p<0.01, ** p<0.05, * p<0.1.*

Table 6: Migration and the probability of leaving a factory

5.4 Changes in conditions and wages with experience

Finally, in table 7 we test the model's prediction that the gap in wages between migrants and locals fades with time. First we include an interaction between *Migrant* and experience in equation 3. When we do this, the results (shown in column 1) are not statistically significant and the point estimate on the interaction of $Migrant \times Experience$ is actually negative. However, note that the OLS results conflate changes in the composition of the workforce over time with the within-worker changes in improvements suggested by the

model. To isolate these within-worker changes, we include worker fixed effects in equation 3 and interact migration status (as well as education and gender) with experience. When we do this, we find that while the overall coefficient on experience is small in magnitude and not statistically significant – suggesting that the locals do not change their conditions with experience, migrants do improve their working conditions with experience. Specifically, with every year of experience, the working conditions faced by a migrant improve by 0.031 standard deviations, compared to the trajectory of a local. As with the results on mobility, the migrant coefficient would not fully disappear over the course of the average worker's career: after six years, the average migrant has made up 59 percent of the overall gap of 0.32 standard deviations between migrants and locals.

In the third and fourth columns, we show the same regressions, but with the outcome as wages rather than conditions. A strict interpretation of the model in which migrants are less likely to be informed would predict that migrants actually lose wages with experience, relative to locals, as they move away from high-wage, low-conditions factories. We, by contrast, find no average difference in the within-worker wage trajectory of migrants versus locals. However, recall that section 4.3 presented several extensions to the model that predict that (ceteris paribus) migrants have higher returns to experience than locals, such as the possibility of wage gains upon switching factories (due to moving up a vertical hierarchy or moving to a factory with a recent positive demand shock). If so, while migrants would still have the motive to switch factories in order to improve working conditions, they would also enjoy the wage gains that come with switching. If their mobility costs are sufficiently high, then it would still not be worthwhile for locals to switch for these wage gains.

Dependent Variable	Index of working conditions ($\hat{c}$)		Log(wage)	
	(1)	(2)	(3)	(4)
Experience	0.0056	0.0173	0.0247*	0.0152
	[0.032]	[0.021]	[0.013]	[0.013]
Migrant	-0.2495**		0.0297	
	[0.100]		[0.057]	
Migrant X Experience	-0.0222	0.0305*	0.0009	0.0000
	[0.031]	[0.018]	[0.015]	[0.014]
Education	0.0052		0.0135	
	[0.016]		[0.009]	
Education X Experience	0.0069	-0.0055	0.0073***	0.0051**
	[0.007]	[0.005]	[0.003]	[0.002]
Male	0.1172		0.2641***	
	[0.118]		[0.067]	
Male X Experience	-0.065	0.0469	-0.0165	0.0044
	[0.050]	[0.031]	[0.020]	[0.018]
Worker fixed effects	No	Yes	No	Yes
Observations	49,210	49,210	46,847	46,847
R-squared	0.033	0.032	0.294	0.170

*Notes: Wage expressed in 2009 taka. Migrant = 1 if the individual is was not born in Gazipur or Dhaka districts, as described in section 2.1. Education and experience measured in years. Standard errors clustered at the level of the individual. *** p<0.01, ** p<0.05, * p<0.1.*

Table 7: Changes in conditions over time

6 Conclusion

While there is reason to believe that firms are very heterogeneous in developing countries, there is little evidence on how workers are matched to firms. We examine this question in the garment industry in Bangladesh during a period in which rapid growth pulled lots of recent migrants from rural areas into the industry. Using a retrospective panel of the wages and working conditions through the career of 991 workers outside Dhaka collected

in 2009, we argue that recent migrants are less able to observe working conditions across firms, and thus end up in firms worse working conditions than local workers. At the same time, these factories if anything pay higher wages, suggesting that they compete for these uninformed migrants by raising but not worker conditions. However, as migrants learn about the industry, they demonstrate a revealed preference for improving their working conditions, compared to their wages.

References

Abowd, John M, Francis Kramarz, and David N Margolis. 1999. "High wage workers and high wage firms." *Econometrica*, 67(2): 251–333.

Absar, Syeda Sharmin. 2009. "Problems surrounding wages: the ready made garment sector in Bangladesh." *Labour and Management in Development*, 2.

Ahmed, Nazneen. 2006. *Bangladesh apparel industry and its workers in a changing world economy.* Wageningen University Thesis.

Ahmed, Nazneen, and Dev Nathan. 2014. "Improving wages and working conditions in the Bangladeshi garment sector: The role of horizontal and vertical relations." *Capturing the Gains Working Paper*.

Amin, Sajeda, Ian Diamond, Ruchira T Naved, and Margaret Newby. 1998. "Transition to adulthood of female garment-factory workers in Bangladesh." *Studies in family planning*, 185–200.

Banerjee, Abhijit V, and Esther Duflo. 2005. "Growth theory through the lens of development economics." *Handbook of economic growth*, 1: 473–552.

Bangladesh Garment Manufacturing Exporters Association. 2013. "Ready-made Garment Yearbook."

Beegle, Kathleen, Joachim De Weerdt, and Stefan Dercon. 2011. "Migration and economic mobility in Tanzania: Evidence from a tracking survey." *Review of Economics and Statistics*, 93(3): 1010–1033.

Biglaiser, Gary. 1993. "Middlemen as experts." *The RAND Journal of Economics*, 212–223.

Brown, Charles, and James Medoff. 1989. "The Employer Size-Wage Effect." *The Journal of Political Economy*, 97(5): 1027–1059.

Bryan, Gharad, Shyamal Chowdhury, and Ahmed Mushfiq Mobarak. 2014. "Underinvestment in a profitable technology: The case of seasonal migration in Bangladesh." *Econometrica*, 82(5): 1671–1748.

Chowdhury, Nazneen Jahan, and Md Hafu Ullah. 2010. "Socio-Economic Conditions of Female Garment Workers in Chittagong Metropolitan Area–An Empirical Study." *Journal of Business and Technology (Dhaka)*, 5(2): 53–70.

Clifford, Stephanie, and Steven Greenhouse. 2013. "Fast and flawed inspections of factories abroad." *The New York Times*, September 1.

de Brauw, Alan, Valerie Mueller, Tassew Woldehanna, et al. 2013. "Does internal migration improve overall well-being in Ethiopia?" *Ethiopia Strategy Support Program II*, 55.

De Leeuw, Jan, and Patrick Mair. 2007. "Homogeneity Analysis in R: The package homals."

De Melo, Rafael Lopes. 2009. "Sorting in the labor market: Theory and measurement." PhD diss. Yale University.

El Badaoui, Eliane, Eric Strobl, and Frank Walsh. 2008. "Is there an informal employment wage penalty? Evidence from South Africa." *Economic Development and Cultural Change*, 56(3): 683–710.

European Commission. 2014. "Staying Engaged - A Sustainability Compact for continuous improvements in labour rights and factory safety in the Ready-Made Garment and Knitwear Industry in Bangladesh."

Franklin, Simon, et al. 2015. "Location, search costs and youth unemployment: A randomized trial of transport subsidies in Ethiopia." Centre for the Study of African Economies, University of Oxford.

Gabaix, Xavier, and David Laibson. 2006. "Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets." *The Quarterly Journal of Economics*, 121(2): 505–540.

Ghosh, Palash. 2014. "Despite Low Pay, Poor Work Conditions, Garment Factories Empowering Millions Of Bangladeshi Women." *International Business Tribune*, March 24(1).

Gifi, Albert. 1981. *Nonlinear multivariate analysis*. University of Leiden Leiden.

Hardy, Morgan, and Jamie McCasland. 2015. "Are Small Firms Labor Constrained? Experimental Evidence from Ghana." Working paper.

Harris, John R, and Michael P Todaro. 1970. "Migration, unemployment and development: a two-sector analysis." *The American Economic Review*, 60(1): 126–142.

Harrison, Ann, and Andrés Rodríguez-Clare. 2010. "Trade, Foreign Investment, and Industrial Policy for Developing Countries." *Handbook of Development Economics*, 5: 4039–4214.

Harrison, Ann, and Jason Scorse. 2010. "Multinationals and anti-sweatshop activism." *The American Economic Review*, 100(1): 247–273.

Heath, Rachel. 2011. "Why do Firms Hire using Referrals? Evidence from Bangladeshi Garment Factories." PhD diss. Yale University Dissertation.

Henderson, V, Adam Storeygard, and U Deichmann. 2015. "Has climate change driven urbanization in Africa?" Working paper, London School of Economics.

International Restructuring Education Network Europe. 1990. "Textile and Garment Industry in Bangladesh: Reports from Women Workers' Struggles." *South Asia Bulletin*, 10(2).

Jovanovic, Boyan. 1979. "Job matching and the theory of turnover." *The Journal of Political Economy*, 972–990.

Kinnan, Cynthia, Shing-Yi Wang, and Yongxiang Wang. 2015. "Relaxing Migration Constraints for Rural Households." National Bureau of Economic Research.

Kleemans, Marieke. 2014. "Migration Choice under Risk and Liquidity Constraints." *University of California, Berkeley*.

Kleemans, Marieke, and Jeremy Magruder. 2015. "Labor market changes in response to immigration: evidence from internal migration driven by weather shocks." *Unpublished manuscript*.

Krueger, Alan B, and Lawrence H Summers. 1988. "Efficiency wages and the inter-industry wage structure." *Econometrica: Journal of the Econometric Society*, 259–293.

Lewis, W Arthur. 1954. "Economic development with unlimited supplies of labour." *The manchester school*, 22(2): 139–191.

Magruder, Jeremy R. 2010. "Intergenerational networks, unemployment, and persistent inequality in South Africa." *American Economic Journal: Applied Economics*, 2(1): 62–85.

Mahmud, Simeen, and Naila Kabeer. 2003. "Compliance versus accountability: struggles for dignity and daily bread in the Bangladesh garment industry." *The Bangladesh Development Studies*, 21–46.

Mailath, George J, and Larry Samuelson. 2013. "Reputations in repeated games." *The Handbook of Game Theory*, 4.

Marchiori, Luca, Jean-François Maystadt, and Ingmar Schumacher. 2012. "The impact of weather anomalies on migration in sub-Saharan Africa." *Journal of Environmental Economics and Management*, 63(3): 355–374.

Morten, Melanie. 2013. "Temporary migration and endogenous risk sharing in village india." *Unpublished Manuscript*.

Munshi, Kaivan, and Mark Rosenzweig. 2016. "Why is mobility in India so low? Social insurance, inequality, and growth." *American Economic Review*.

Oka, Chikako. 2010. "Accounting for the gaps in labour standard compliance: The role of reputation-conscious buyers in the Cambodian garment industry." *European Journal of Development Research*, 22(1): 59.

Robertson, Raymond, Sari Sitalaksmi, Poppy Ismalina, and Ardyanto Fitrady. 2009. "Globalization and working conditions: Evidence from Indonesia." *Globalization, Wages, and the Quality of Jobs*, 203.

Saxena, Sanchita. 2014. *Made in Bangladesh, Cambodia, and Sri Lanka: the labor behind the global garments and textiles industries.* Cambria Press.

Shanmugam, KR. 2001. "Self selection bias in the estimates of compensating differentials for job risks in India." *Journal of Risk and Uncertainty*, 22(3): 263–275.

Sigg, Christian, and Maintainer Christian Sigg. 2014. "Package nsprcomp."

Sigg, Christian D, and Joachim M Buhmann. 2008. "Expectation-maximization for sparse and non-negative PCA." 960–967, ACM.

Sorkin, Isaac. 2015. "Ranking Firms Using Revealed Preference." *mimeo*.

Strobl, Eric, and Marie-Anne Valfort. 2015. "The effect of weather-induced internal migration on local labor markets. Evidence from Uganda." *The World Bank Economic Review*, 29(2): 385–412.

Tanaka, Mari. 2015. "Exporting Sweatshops? Evidence from Myanmar." *mimeo*.

Teal, Francis. 1996. "The size and sources of economic rents in a developing country manufacturing labour market." *The Economic Journal*, 963–976.

The Alliance for Bangladesh Worker Safety. 2014. "Alliance Fire Safety and Structural Integrity Standard."

Viscusi, W Kip. 1980. "A theory of job shopping: A Bayesian perspective." *The Quarterly Journal of Economics*, 94(3): 609–614.

Wang, Shing-Yi. 2013. "Marriage Networks, Nepotism, and Labor Market Outcomes in China." *American Economic Journal: Applied Economics*, 5(3): 91–112.
1

Appendix A

Dependent Variable: Index of working conditions constructed leaving out…						
	Appointment letter		The worker's own report		All reports from current factories	
	(1)	(2)	(3)	(4)	(5)	(6)
Migrant	-0.2480***	-0.2655***	-0.3111***	-0.3296***	-0.3463***	-0.3778***
	[0.084]	[0.095]	[0.082]	[0.083]	[0.083]	[0.092]
Male		-0.0382		-0.1426**		0.0041
		[0.094]		[0.069]		[0.094]
Education (Years)		0.0185		0.0295***		0.0204
		[0.015]		[0.010]		[0.014]
Experience (Years)		-0.015		0.0098		-0.0255
		[0.024]		[0.009]		[0.023]
Observations	49,276	49,210	39,852	39,788	43,018	42,954
R-squared	0.008	0.014	0.013	0.025	0.015	0.027

*Notes: Each index is standardized to have mean 0 and standard deviation 1. Migrant = 1 if the individual is was not born in Gazipur or Dhaka districts, as described in section 2.1. Standard errors clustered at the level of the individual. *** p<0.01, ** p<0.05, * p<0.1.*

Table A1: Alternate constructions of the working conditions measure

Dependent Variable = Person-level index of working conditions			
	(1)	(2)	(3)
Migrant	-0.1037	0.0018	-0.1316
	[0.098]	[0.154]	[0.220]
Male	0.0721	0.1204*	0.1128
	[0.073]	[0.070]	[0.075]
Education (Years)	0.0058	0.0252**	0.0219
	[0.009]	[0.011]	[0.015]
Experience (Years)	0.0205***	0.0187	0.0206
	[0.006]	[0.012]	[0.013]
Factory FE	Yes	Yes	Yes
Past observations	Yes	No	No
Village fixed effects	No	No	Yes
Observations	45,500	839	839
R-squared	0.599	0.459	0.495

*Notes: The index of working conditions is described in section 2.4; in this analysis, it is standardized to have mean 0 and standard deviation 1 across all workers. Migrant = 1 if the individual is was not born in Gazipur or Dhaka districts, as described in section 2.1. "Past observations" refer to any month in which they worker has been in the garment industry since she began working, constructed using the retrospective panel structure of the data, as described in section 2.1. In column 1, standard errors clustered at the level of the individual. In columns 2-3, standard errors clustered at the level of the village. *** p<0.01, ** p<0.05, * p<0.1.*

Table A2: Within-factory variation in the working conditions measure

Dependent Variable = Index of working conditions ($\hat{c}_{ift}$)						
	(1)	(2)	(3)	(4)	(5)	(6)
From outside of village	-0.5184***	-0.5831***	-0.2725*	-0.3207**	-0.1608	-0.1943
	[0.110]	[0.113]	[0.149]	[0.141]	[0.127]	[0.143]
Male		-0.3479***		-0.0566		0.0067
		[0.085]		[0.084]		[0.073]
Education (Years)		0.0500***		0.0295***		0.0204**
		[0.012]		[0.010]		[0.010]
Experience (Years)		0.0176		0.0149*		0.0078
		[0.016]		[0.008]		[0.008]
Past observations	Yes	Yes	No	No	No	No
Village fixed effects	No	No	No	No	Yes	Yes
Observations	50,180	50,114	990	987	990	987
R-squared	0.023	0.062	0.007	0.03	0.267	0.279

*Notes: The index of working conditions is described in section 2.4; it is standardized to have mean 0 and standard deviation 1. From outside of village = 1 if the individual is was not born in the village where they reside at the time of survey. "Past observations" refer to any month in which they worker has been in the garment industry since she began working, constructed using the retrospective panel structure of the data, as described in section 2.1. In columns 1 and 2, standard errors clustered at the level of the individual. In columns 3-6, standard errors clustered at the level of the village. *** p<0.01, ** p<0.05, * p<0.1.*

Table A3: Robustness of Main Table 4 results to alternative definition of migrant variable: Defining migrants as anyone born outside the village where they currently reside

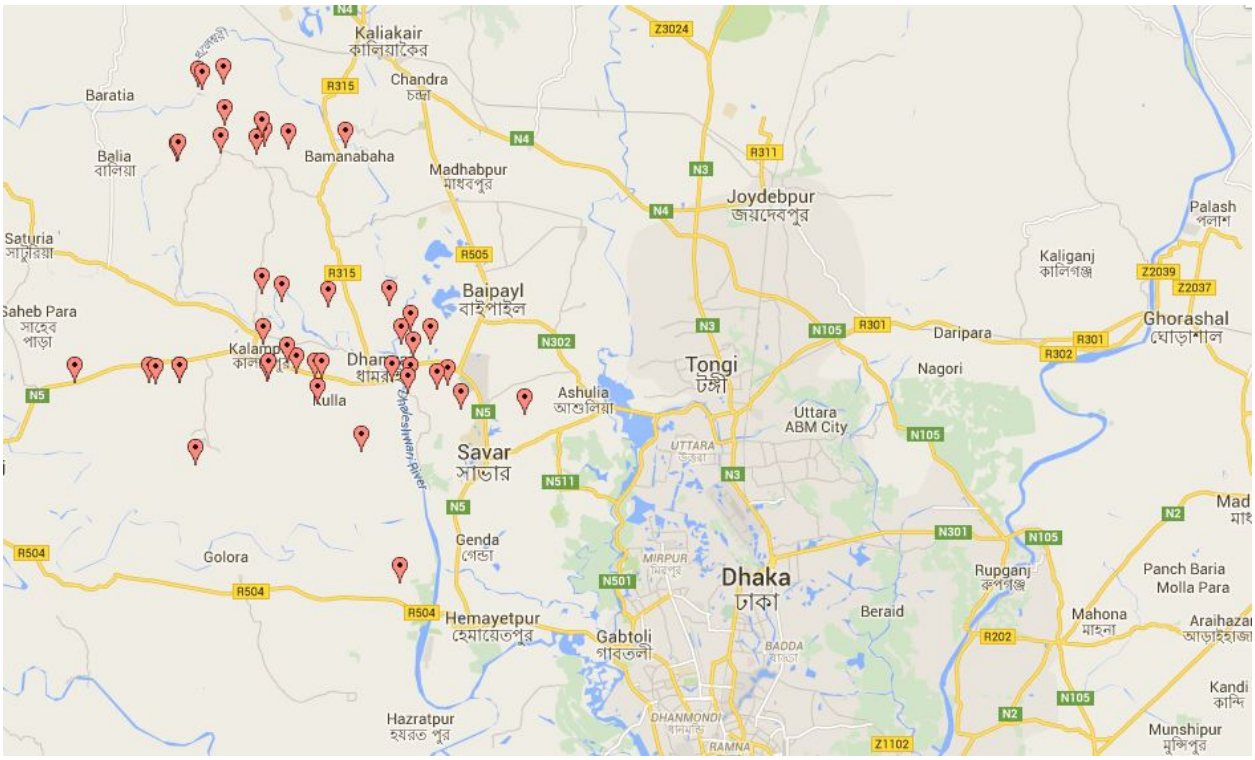

Figure A1: Sample villages

Appendix B

Following the 2013 Rana Plaza collapse, the Bangladesh Accord on Fire and Building Safety (the Accord) and the Alliance for Bangladesh Worker Safety (the Alliance) developed harmonized building safety standards for garment factories in Bangladesh. The building safety standards include requirements for structural, fire, and electrical building safety. The coalitions' building safety standards are largely based on the 2006 Bangladesh National Building Code (BNBC), although in some cases the standards exceed the standards set out by the BNBC (The Alliance for Bangladesh Worker Safety, 2014).

In 2013, both initiatives began conducting building safety audits of factories in their supplier bases. Both initiatives make the audits results publicly available on their websites. The Alliance's audits report factories' compliance with a standard set of requirements, which allows us to calculate overall compliance levels for factories audited by the Alliance. Figure A2 displays the distribution of building safety compliance levels for 279 garment factories audited by the Alliance that are located within commuting distance of workers in our sample.

Mean building safety compliance for Alliance-audited factories in this area was 63%, with a standard deviation of 7.4%. The lowest performing factory complied with 46% of the standards, and the highest performing factory complied with 86% of the standards.

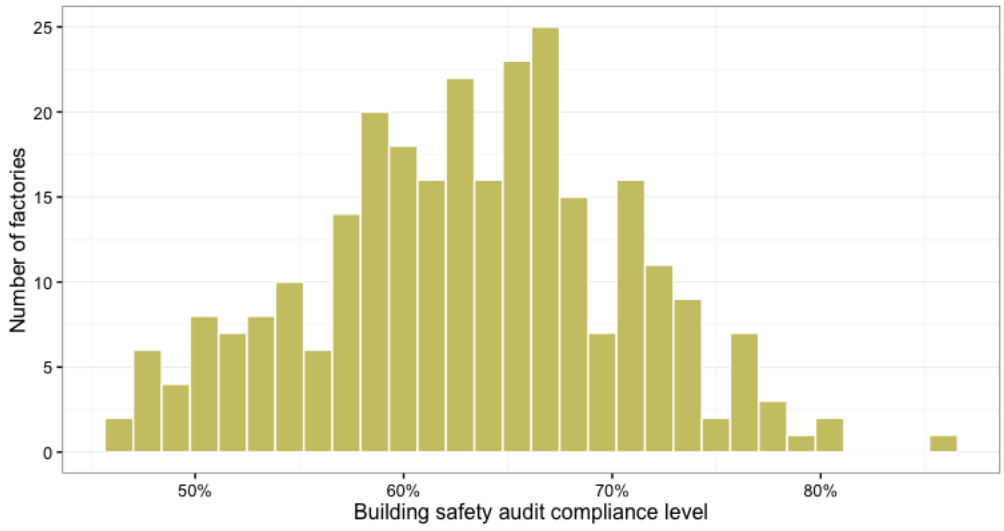

Figure A2: Distribution of building safety compliance of exporting factories in study area

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