Negotiations and Undercutting in Low Wage Labor Markets *

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Abstract

A large literature has studied wage setting in high-income countries, but little is known about how wages are determined in the informal labor markets that account for the majority of employment in low- and middle-income countries. We study this question using data on firm–worker negotiations at spot markets in India, where workers gather daily in search for jobs. Despite excess labor supply, workers undercut one another in only 27% of negotiations. This rate varies sharply with contract structure: workers are nearly twice as likely to undercut under *Fixed Work* contracts, where pay is tied to task completion, as under *Fixed Hour* contracts, where pay is tied to number of hours. We explain this pattern with a model in which reservation wages depend on the value of leisure within a workday, and effort choices—shaped by ability—determine attainable leisure time. Under *Fixed Hour* contracts, hours are fixed, so ability differences do not affect reservation wages and the distribution is compressed. Under *Fixed Work* contracts, completion time is endogenous—higher-ability workers finish faster, retain more leisure, and accept lower wages—generating greater dispersion in reservation wages. The model predicts, and the data confirm, that undercutting is more prevalent for jobs with more dispersed reservation wage distributions. These findings show that contract structure mediates how competition among workers translates into wage outcomes in low-wage labor markets.

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1 Introduction

A growing literature on labor markets in high-income countries has studied how wages are set and whether firms possess wage-setting power (Prager and Schmitt (2021); Berger et al. (2022); Jarosch et al. (2024); Card (2022)), yet we know much less about how wages are set in the informal labor markets that dominate employment in low- and middle-income countries (LMICs). Millions of workers in LMICs seek daily employment at informal spot markets (or "labor stands"), where employers recruit for short-term, low-skilled jobs.[1] Workers travel considerable distances to reach these stands and face substantial excess labor supply, with many returning home without work.[2] Wages are negotiated orally, with no documentation or legal enforcement. These markets anchor the lower bound of daily wages in urban areas of LMICs and are part of the broader informal economy, which accounts for over 60 percent of global employment (International Labour Organization (2023)). Despite their importance, direct evidence on how wages are determined in these markets remains scarce because worker-firm negotiations themselves are difficult to observe. A theoretical tradition starting with Dasgupta and Ray (1986) and Osmani (1990) has argued that wages in such markets may remain above competitive levels due to subsistence needs and implicit cooperation, and recent empirical work documents the role of social sanctions in sustaining wage floors (Breza et al. (2025)).

Yet when labor supply is abundant and workers are close substitutes, even small wage concessions can tip the hiring decision, creating strong incentives for workers to undercut one another. Whether and how this occurs in practice—and what role the structure of employment contracts plays in shaping wage outcomes—remains an open question. This paper investigates wage setting in informal spot markets using data on firm–worker negotiations from spot markets in Patna, India. We ask: (i) Do workers undercut one another during negotiations? (ii) How does undercutting vary across contract structures? (iii) What do these patterns reveal about the wage-setting process in informal labor markets?

To address these questions, we collect data on real-time wage negotiations between firms and workers at 22 spot markets in Patna, India, over an eight-month period. The data captures the details of the job that the firm is hiring for, offers and counter-offers made by firms and all workers participating in the negotiation. This allows us to directly observe the bargaining process between firms and workers, providing a rare window into

[1] In most cases, these employers are one-person firms overseeing small-scale construction tasks, such as building a house or transporting materials.

[2] See Varun (2024) for details on unemployment at labor stands. Breza et al. (2021) finds that roughly one-quarter of workers in village agricultural labor markets are rationed.

how wages are actually set in these informal markets.

Our first key finding is that wage undercutting is relatively uncommon: only 27 percent of the 1,417 observed negotiations involved a worker offering to work at a lower wage than the previous offer of a worker. This challenges the theoretical view of these markets as being frictionless and fully competitive, and instead suggests that informal wage floors may be more widespread than commonly assumed. Importantly, we observe significant heterogeneity in undercutting behavior. The likelihood that a worker undercuts another varies systematically with the structure of the employment contract offered by the firms for different type of jobs.

To understand the heterogeneity in undercutting behavior we classify jobs in our data into two broad categories: (i) *Multiple Task*, which require the worker to perform several distinct activities that may vary in scope and complexity, and (ii) *Single Task*, in which the worker focuses on a well-defined single activity. Similarly, we distinguish between two common contract forms: *Fixed Work* contracts, in which workers are paid upon completion of the job irrespective of the time taken, and *Fixed Hour* contracts, where workers are paid a daily wage for a fixed number of working hours (usually eight). *Fixed Work* contracts are similar to piece rates contracts, and they have been to shown to improve worker productivity by Lazear (2000), Shearer (2004).

Using our data, we document that firms predominantly hire for *Multiple Task* jobs through *Fixed Hour* contracts, while *Single Task* jobs are most commonly filled using *Fixed Work* contracts. This empirical pattern reflects an equilibrium decision that is consistent with the multitasking model of incentive contracts (Holmstrom and Milgrom (1991)). When effort on multiple tasks is difficult to monitor or measure individually, firms are less likely to use output-based incentives and instead prefer time-based contracts. Conversely, when the task is singular and the output is verifiable, performance-based pay becomes optimal.

We then examine how the incidence of undercutting varies across these two contract types. We find that workers are nearly twice as likely to undercut when negotiating for *Fixed Work* contracts (approximately 40 percent) compared to *Fixed Hour* contracts (21 percent). Moreover, the extent of undercutting, measured as a fraction of the first offer of any worker and difference between the first offer of any worker and the offer at which the agreement happens is 6 percentage points ($\sim 40\%$) higher for *Fixed Work* contracts.

These differences in undercutting across contracts are robust to the inclusion of fixed effects for the day of the negotiation, which account for variation in labor supply or demand across days. Additionally, the results we document are robust to inclusion of enumerator fixed effects, and the time of the day at which the negotiation occurs.

Standard auction models imply that as the value of the prize increases, equilibrium bids intensify (Lazear and Rosen (1981); Baye et al. (1996); Hillman and Riley (1989)). In job–auction and matching frameworks, this translates into stronger wage concessions by applicants when the monetary stakes of winning the job are higher (Shimer, 1999; Hatfield and Milgrom, 2005). In our case this would mean that undercutting should be more likely in negotiations for jobs which have higher monetary value, where the returns to winning the job are greater. To test this, we construct a measure of the per-worker value of the contract. This is defined as the final wage offer divided by the number of workers being hired. When we control for this variable the results remain quantitatively unchanged, indicating that differences in contract value do not account for the observed variation in undercutting rates.

Another potential explanation for the observed differences in undercutting is that there may be a systematic difference in the number of workers negotiating for *Fixed Work* contracts. To test this, we control for the number of workers involved in each negotiation. As expected, we find a strong positive relationship between the number of negotiating workers and the undercutting rate. However, the difference in undercutting rates between *Fixed Work* and *Fixed Hour* contracts remains substantial and statistically significant even after controlling for this variable.

The difference in undercutting across contracts does not appear to reflect worker-side selection into contracts. While some workers do specialize and prefer to work in one of *Single Task* or *Multiple Task* jobs, the oversupply of workers compared to jobs implies that workers are competing for all jobs on offer at the spot market. To further examine whether worker preferences across job types explain the observed differences, we conducted a separate survey with 843 workers. We find that 39 percent of respondents *typically* take up Multiple Task jobs, 35 percent typically work on Single Task jobs, and the remaining 26 percent report doing both types. If undercutting were primarily driven by the number of workers competing for a given job type, we would expect undercutting to be higher for *Multiple Task* jobs, which have a slightly larger base of willing workers. However, this is not what we observe.

As noted earlier, there is a strong correlation between job type and the type of contract under which these jobs are offered. This raises the concern that the observed relationship between undercutting and contract structure may be driven by workers' actions in relation to the type of jobs rather than the nature of the contract. To assess this possibility, we exploit variation in contract type within *Single Task* jobs. Within this subset, we find that undercutting rates are significantly higher for jobs offered on *Fixed Work* contracts, and the estimated coefficient is quantitatively similar to our overall result.

An alternative explanation is that social norms suppress undercutting differentially across contract types. Breza et al. (2025) document that workers in rural agricultural markets face social sanctions for accepting wages below the prevailing rate, and similar forces are likely present in our setting. However, for norms to explain the contract-type gap, norm enforcement would need to be systematically weaker for *Fixed Work* negotiations. This is difficult to sustain: the two contract types are offered at the same stands to overlapping populations of workers, and the gap persists even within single-task jobs, where the social group competing for work is held constant (Table 3). The seasonal evidence further weighs against a norms account. If norms are the binding constraint on undercutting, the contract-type gap should narrow during the lean season, as economic desperation erodes workers' willingness to enforce wage floors. Instead, the gap widens — undercutting rises for both contract types, but more so for *Fixed Work* (Table 4, column 2).

To rationalize our results, we build a model where workers are willing to undercut others until they reach their own reservation wage (after accounting for the social costs of undercutting). The reservation wage of an individual worker (who varies in ability) for a contract depends on their market participation value (which differs across workers), the cost of effort (which varies across contracts), and the value of leisure afforded by the contract within an eight-hour workday. The number of leisure hours depends on the type of contract, the worker's ability, and the effort workers (optimally) choose.

In a *Fixed Hour* contract, workers are required to work for eight hours, leaving no leisure time after the job. Since the number of hours is fixed and effort is costly, workers exert similar efforts in these contracts. This imposes the same cost of effort on all workers. Consequently, the distribution of reservation wages for *Fixed Hour* contracts has the same variance as the distribution of market participation value.

By contrast, in *Fixed Work* contracts, completion time is endogenous. Workers can trade off effort against leisure: higher-ability workers complete tasks more quickly and thus retain more leisure for the same cost of effort. This heterogeneity in the effort–leisure trade-off generates additional variation across workers, leading to a more dispersed distribution of reservation wages under *Fixed Work*.

The model yields two testable predictions. First, the reservation wage distribution should be more dispersed for *Fixed Work* contracts than for *Fixed Hour* contracts. Second, greater dispersion in reservation wages should be associated with higher undercutting. Consistent with these predictions, we show in the data that the variance of workers' reservation wages is markedly higher for *Fixed Work* jobs, and that jobs with greater dispersion in reservation wages exhibit significantly more undercutting in negotiations.

We also rule out alternative theoretical explanations that could account for the higher

rates of undercutting across contract types. One such explanation is that workers' beliefs about appropriate wages may still be evolving, particularly in cases where wage norms have not yet stabilized. Under this view, jobs that are offered infrequently may exhibit higher undercutting simply due to greater uncertainty about prevailing wage expectations. To assess this, we examine the relationship between undercutting and job frequency within the set of jobs offered on *Fixed Work* contracts. Using the number of observations of each job as a proxy for job frequency, we do not find a negative correlation between the frequency of a job and the undercutting rate. This finding runs counter to the belief-uncertainty explanation, and and is inconsistent with the view that undercutting reflects uncertainty about wage norms for infrequent jobs, further supporting the interpretation that contract structure is the relevant margin of variation.

The differential rate of undercutting, associated with greater dispersion in beliefs, offers insights into the wage-setting process in low-wage labor markets. Because these jobs rely heavily on physical labor, leisure is valuable as it allows workers to recuperate. Under *Fixed Hour* contracts, where firms purchase workers' time, individual ability does not affect wages since all workers commit to the same hours and can pace themselves. By contrast, under *Fixed Work* contracts, firms purchase completion of a specific task, making worker ability central to wage setting. High-ability workers can finish tasks more quickly, effectively trading leisure for money, and thus have scope to undercut lower-ability workers. These patterns are consistent with contract structure shaping how competition among workers translates into wage outcomes.

Related Literature and contributions This paper contributes to the growing literature on labor markets of low and middle income countries. We focus on an important institution of these markets, the spot market for labor, where millions of workers and thousands of firms search for a match.

First, we contribute to the empirical literature on wage setting in the informal sectors of low and middle income countries by showing that undercutting by workers in these markets is uncommon but varies significantly with the kind of job. This result is related to work by Breza et al. (2025) and Osmani (1990), which have argued that wage floors are common in agricultural labor markets, and workers within a sex are offered uniform wages regardless of their productivity. Our results show that this phenomenon is determined by the nature of the contract being offered. Other related work by Kaur (2019) has shown that the (nominal) wage setting process itself is downward rigid with demand shocks (caused by high rainfall), pushing wages up over time.

Unlike Breza et al. (2025), where offers are made by a combination of researchers and

employers to workers who may or may not be actively looking for work in agricultural labor markets, our data captures reals offers made by firms to workers who have traveled long distances in search for work and hence are actively looking for jobs. Their work finds that only 1.8% workers accept a wage below the going wage in public for daily wage jobs in agriculture.[3] Taking undercutting as a measure of accepting wage below the going wage, we find that this figure is much higher (around 21%) in our setting. Unlike rural markets where workers are made offers at their homes, workers in our setting spend 5-10% of the daily wage in coming to the spot markets.

Secondly, we contribute to the theoretical literature on wage setting in informal markets of low and middle income countries by introducing a novel model through which low income workers decide their reservation wage. The model highlights the importance of leisure hours in a worker's decision to supply effort. This channel is particularly relevant for jobs involving manual labor, which constitute a dominant share of employment in low- and middle-income countries. When number of hours are not contracted, then higher ability workers can increase their hours of leisure compared to low ability workers, which reduces the reservation wage of higher type workers compared to workers of lower types. This increase in the dispersion of the reservation wage distribution is consistent with higher undercutting in jobs which do not contract on hours.

Our third contribution is to the empirical literature on wage setting. We demonstrate that greater dispersion in the reservation wage belief distribution increases the extent of undercutting among workers during wage negotiations with firms. While workers undercut each other in negotiations for both *Fixed hour* and *Fixed Work* contracts, the extent of undercutting is twice as large for *Fixed Work* contracts. This heightened undercutting is associated with jobs that exhibit a higher dispersion in reservation wage distribution.

Additionally, while the threat of social sanctions for undercutting, highlighted in Breza et al. (2025), is relevant across both contract types, its deterrent effect varies with the degree of dispersion in workers' beliefs about the appropriate wage floor. These findings highlight the interaction between belief structures and wage distribution characteristics in shaping negotiation behavior in informal labor markets.

We further contribute to the understanding of wage-setting processes by introducing a novel approach that leverages real-time negotiation data between firms and workers. This method captures the sequence of back-and-forth offers in a natural setting, enabling us to derive a measure of undercutting. This approach provides unique insights into the existence of wage floors in informal spot markets, complementing prior research that predominantly relies on *take-it-or-leave-it* offers in experimental settings (Breza et al. (2025)).

[3]These jobs are similar to *Multiple Task* jobs offered on *Fixed Hour* contracts in our setting.

Our study is one of the few in economics to utilize detailed data on sequential bargaining between firms and workers. While this approach is rare in labor market studies, related work by Larsen and Zhang (2021) and Keniston et al. (2021) has applied sequential bargaining data in other contexts to examine issues such as bargaining power and fairness. By applying these methods to informal labor markets, we provide new insights into the dynamics of wage negotiation and the role of contract and belief structures in shaping outcomes.

This paper is organized as follows. In Section 2, we describe our setting in detail. We define terms used across the paper in Section 3. We follow this up with a description of the sources of data and the data collection process in Section 4. Section 5 summarizes the negotiation and beliefs data and Section 6 shows our empirical results on undercutting. We use these results to build a model of reservation wage in section 7. The model generates predictions about the data which we test in section 8. Section 9 concludes.

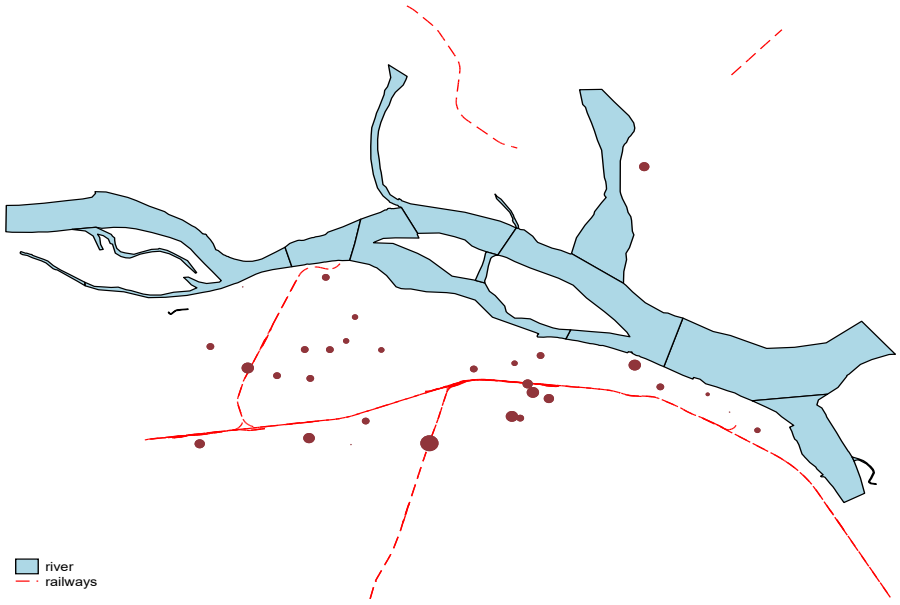
2 Setting

Spot labor markets, or labor stands, are locations in urban areas where workers gather in search of work. Firms are aware of these locations and come to these markets to find workers. The nature and location of spot markets vary with the type of work. For instance, workers in the garment sector tend to gather near garment factories. Garment firms needing workers can hire them from these locations. The concentration of garment firms in one area can lead to thick spot markets. Construction workers will gather near a construction site for a public infrastructure project or in areas with several private housing projects. Over time, these locations may remain as spot markets even if the construction projects move to other areas.

This paper focuses on the spot markets for workers in construction and affiliated industries. The construction industry makes up around 8% of the GDP of India. This includes large public infrastructure programs such as construction of roads and mass rapid transit systems (Metro) across multiple cities, as well as private construction of apartments, residential and business complexes, and private housing. While large operations are overseen by construction firms, smaller projects are often taken by private contractors. These contractors operate as informal firms with 1-2 employees working under them. Data collected in Varun (2024) shows that these firms operate three projects on average and have approximately 10 laborers working under them.

The construction industry provides work to a large number of workers. This includes electricians, plumbers, painters, masons, manual laborers, with the number of workers

Figure 1: Spot markets in Patna



Note: Size of dots is proportional to the number of laborers at the spot market.

being higher in latter occupations and skill required being higher in the former. Manual labor requires comparatively less skill and most of the learning happens on the job, and is therefore an avenue for untrained young workers to gain employment. The outside option for most of these workers would be agricultural labor, and many of them switch between construction and agriculture work depending on the season of the year. These workers find work through spot markets or through prior connections with contractors (the firm), masons or laborers. Most of the manual laborers don't have enough education to seek work in the formal sector.[4]

Firms which hire workers from the spot markets can be categorized into two types: contractors, who are essentially a 1 person firm and are in the business of supervising construction work, and private employers, who go to the labor stands only when they have some work. Many private employers hire contractors to oversee the construction work they are undertaking, in which case, the contractor hires the workers. However, private employers may directly hire workers for short term work.

The spot markets we focus on mostly provide employment to masons, and manual laborers in construction. Job of a laborer in construction can include one or more of lifting sand, bricks, mud or cement, making and carrying the concrete mixture, cleaning the work site or digging a ditch. One job for which the laborers are often hired for is helping

[4]In a sample of 1360 workers we surveyed in Varun (2024), the average years of education was 4.12.

the mason with plastering. This job includes several tasks — carrying bricks and passing it to the mason; lifting sand, mixing it with cement and water; making the mixture, and passing it to the mason. In our framework this job is classified as a *multiple task* job. Firms generally hire workers for these jobs on a *Fixed Hour* contract, where worker is paid a certain amount for a fixed number of hours, which equals eight in most cases. These jobs may be for more than one day, in which case the contractual structure (how much money is paid each day) can vary.[5]

In addition to the jobs in which worker is hired for doing multiple tasks, laborers are often hired for jobs which include performing a *single task*. For instance, laborers may be hired for carrying certain amount of sand to the second floor of a building from the ground floor or they might have to carry a certain number of bricks to the fourth floor of a building. In these jobs, the task is clearly defined — carrying an X amount of an object Y from point A to B. There is no limitation on time, though firms would mostly prefer workers who would do this quickly. Other jobs which fall in this category would be digging a ditch of a certain size. It is common for firms to hire workers for these kind of jobs on *Fixed Work* contracts, where workers are paid the agreed amount after completing the task. The worker has the incentive to complete the task quickly. Therefore, this contract is similar to a contract where a worker is paid at a piece-rate.

For our analysis, we classify the jobs that firms hire for on the basis of the number of tasks the worker has to perform in those jobs. We will show that for jobs which involve doing multiple tasks (which we call *multiple task* jobs), firms mostly hire workers on *Fixed Hour* contracts for the whole day. For jobs which involve a single well-defined task, firms hire workers on what we call *Fixed Work* contracts, where workers are paid after the task is completed (no matter the number of hours required to complete the task).

3 Definitions

We use this section to formally define some of the recurring terms used in the paper.

Definition 1. *A job which requires the worker to do multiple tasks often in a sequence is referred to as a multiple task job.*

Definition 2. *A job in which the worker has to complete a single task is referred to as a single task job.*

Definition 3. *Fixed hour contracts are those in which the worker is hired for a fixed number of hours for a certain wage. Wages are paid at the end of the requisite number of hours.*

[5]See Varun (2024) for a detailed study of the contractual structures in this setting.

In these contracts, workers are usually hired for the entire day which equals eight hours of work in most cases. The wage for the day or for a certain number of hours is fixed, but the nature of work within the contract may vary and is not well defined.

Definition 4. *Fixed work contracts are those in which the work is well defined, but the number of hours are not, and work has to be completed before any payment is paid to the worker.*

In these contracts, workers are hired for a particular task which is well defined. In contrast to *Fixed Hour* contracts the number of hours of work is not fixed.

We create two measures of undercutting. The first measure is called *Undercutting on wage*.

Definition 5. *Undercutting on wage occurs when one worker offers to work for less than the wage quoted by another worker.*

We use this as the primary measure of undercutting throughout the paper. The second measure of undercutting is a superset of *Undercutting on wage*, and we call this *Undercutting - interference*.

Definition 6. *Undercutting - interference is deemed to have happened when a worker enters into an ongoing negotiation and conveys interest in the job.*

The need for this measure arises because workers feel that other workers should not interfere in ongoing negotiations and the discontent at such action is often expressed colloquially as *Don't interrupt, I'm talking [to the employer]*. Note that this form of undercutting isn't considered to have happened automatically when more than one worker is present, but only when another worker expresses interest in the job during an ongoing negotiation. The value of each contract is determined by dividing the amount offered by the number of workers being hired.

4 Data

We collected data on negotiations between firms and workers at spot markets in Patna, the capital of the state of Bihar. These spot markets, also known as labor stands, are key sites where daily-wage workers seek short-term employment. There are around 40 such stands in the city. We collected data at 22 of them between January 2024 and September 2024.[6] The stands were not randomly chosen and instead we focused our data collection at labor stands which have a higher footfall of workers.

[6]The total labor stands where we collected data is 22. However, only 15 labor stands have more 10 observations in our sample and 8 labor stands make up 90% of the observations in the data.

4.1 Data Collection process

4.1.1 Negotiation Data

The data on negotiations was collected in the following manner. Three enumerators were allocated to each stand, and were instructed to note down information about the negotiations between firms and workers.[7] Representative of firms or private employers start arriving at the stand around 7 am. Enumerators remained at the stand until the end of the spot market, ensuring coverage of the full hiring window. The employers generally arrive on motor bikes, though some come on foot as well. As there are more workers than employers, the employers are surrounded by workers upon their arrival.

The enumerators were instructed to embed themselves within the group of workers when the employer arrived at the labor stand. They were asked to note down all the details of conversations between the firm and the worker. In most conversations, the firm begins the negotiation by describing the details of the job they were hiring for. This information allows us to categorize each job into different types — lifting bricks, lifting sand, plastering, among others — and other relevant details about the job, such as the number of hours/days for which the employer was hiring or the quantity of construction material that had to be lifted and till where. The enumerators were instructed to note down the number of workers negotiating with the firm.

After the employers described the task, either they or one of the worker would state a starting offer, which the enumerator would note down. Any counter offers made by the firm or other workers were noted as well. A negotiation was coded as successful if the employer and at least one worker reached an agreement on wage and terms of employment. If the enumerator missed any information during the negotiations, they were instructed to ask a worker who was part of the negotiation after it was over. The data was collected using a digital data collection tool. Appendix section D gives examples of negotiations as recorded by the enumerators.

Each labor stand was typically staffed by three enumerators and one Field Manager. Enumerators attempted to record all hiring conversations that took place at each stand on the observation day. The Field Manager's role was to coordinate coverage by assigning enumerators to employers as they arrived. When multiple employers arrived at once, the Field Manager ensured that each enumerator was assigned to a different employer to observe their interactions. Once an enumerator finished documenting a conversation, the Field Manager immediately reassigned them to the next employer who arrived. If the

[7] Three represents the median number of enumerators at a stand. Smaller stands typically had two enumerators, while larger stands could have as many as five.

number of employers exceeded the number of available enumerators, the Field Manager stepped in and acted as an additional enumerator. This system substantially reduced, though did not entirely eliminate, the risk of missed negotiations.

Converting collected data into variables The information recorded by the enumerators was coded into relevant variables for analysis. Each job was classified as either *Single Task* or *Multiple Task*. For each job type, the kind of contract was coded, along with an indicator of whether undercutting occurred in each negotiation.

This coding process was carried out as follows. In the first round of data collection, enumerators were trained to classify the contract type and identify instances of undercutting. This information was directly entered by them into the data collection tool. The data was subsequently reviewed by senior field staff and the research team, based on the definitions provided in the previous section. Any discrepancies in the enumerators' categorization were discussed and corrected.

In later rounds, the coding process was handled directly by the research team, with support from senior field staff. When uncertainties arose during the coding process, the relevant enumerators were consulted to clarify details.

4.1.2 Data on beliefs of workers about wages

In addition to documenting hiring negotiations, we also collected data on workers' wage beliefs—specifically, their perceptions of the prevailing wage and their own reservation wage for different types of jobs. To gather this information, enumerators randomly selected workers from the entire pool present at the labor stand, including those not actively engaged in negotiations with employers.

Once selected, each worker was escorted by an enumerator to a more private location approximately 15 to 20 meters away from the main stand. This distance was chosen to ensure a degree of privacy and to reduce the likelihood that responses would be influenced by nearby conversations or peer dynamics. The aim was to minimize potential spillover effects and to address concerns workers might have had about social sanctions or judgment from peers, as highlighted in prior research (see Breza et al. (2025)).

Workers were then asked: *What is the going wage for X?*, where X represented specific jobs such as lifting a tractor of sand up two floors or performing eight hours of daily labor. To determine their reservation wage, we posed questions such as: *What is the minimum wage at which you would agree to perform X?*. The reservation wage data enables us to examine the relationship between the variance (standard deviation) of a job's reservation

wage distribution and the extent of undercutting observed during wage negotiations for that job.

4.2 Data description:

In this subsection, we list the variables that we obtain from the data collection process. For each negotiation, we directly observe the following variables:

- The type of job, for example: lifting sand, lifting bricks, or helping mason in brick laying.
- The amount of material to be carried in each job (if applicable) and to what distance.
- The starting offer of employers and all workers who were part of the negotiation.
- The last offer of employers and all workers who were part of the negotiation.
- The number of workers the firm is hiring for the job.
- Whether there is agreement or not.
- The agreed amount of payment for the job.
- Time of negotiation.[8]

Using the information collected by the enumerators we create the following variables:

- The contract on which the firm is hiring — *Fixed Hour* or *fixed work*.
- Whether the job is *Single Task* or *Multiple Task*.
- Whether undercutting happens in each negotiation.

5 Summary statistics of data collected

We begin by providing a descriptive summary of our negotiation data. Then we present the relationship between the different type of jobs for which the firms hire at the spot market and the contracts offered for these jobs.

[8]This was observed only for a sub-sample of negotiations.

5.1 Descriptive summary

Table 1 Panel A shows the summary statistics of the negotiations we observe at the spot markets. 69% of the contracts in these negotiations are fixed hour, where workers have to work for 8 hours for a given wage. The remaining 31% contracts are fixed work. Across all negotiations, workers undercut one another on wages in 27% of cases. This figure is small considering the fact that workers find work on only half the days they come to the spot market.[9] These trips to the spot market are costly and workers spend on average 40 INR daily, which amounts to 8% of the daily wage for *Fixed Hour* contracts.[10] Despite this, workers don't undercut each other on wages at a high rate. Workers interfere in ongoing negotiations in 52% cases. As defined before, this measure captures workers entering into an ongoing negotiation between a firm and a worker and expressing interest in the job. They may choose to quote a wage which is the same as the worker who was negotiating. In such a case, they don't undercut each other on wage but through interference.

Note that the absence of interference by other workers during a negotiation—i.e., when *Undercutting - interference* is coded as 0—does not imply that those workers are uninterested in the job or unaware of the ongoing negotiation. Whenever a firm arrives at the labor stand to hire, it is typically surrounded by a number of workers. Even in negotiations where no *Undercutting - interference* occurs, many workers gather around the firm's representative and listen to the terms of the job being offered. A majority of negotiations are successful, and only 16% aren't.

Panel B of Table 1 summarizes the type of jobs which workers seek in our sample of belief data. 35% workers mostly work on single task jobs, 39% mostly work on multiple task jobs and 26% work on both type of jobs.

5.2 Relation between job types and contracts offered

We classify the jobs for which firms hire at the spot market into two types. *Multiple task* jobs are those in which firms hire workers to do a number of tasks within the same job. The most common among these is masonry and plastering. In this job, the worker has to carry the bricks and pass them to the mason; lift sand, mix it with cement and water; and pass the mixture to the mason. The worker may also have to do some cleaning. For this kind of job, workers are often hired for the entire day, which generally entails 8 hours of work. The (oral) contract is designed in this manner for two reasons. Firstly,

[9]The extent of unemployment varies between lean and peak seasons. In Varun (2024), workers report finding work on 63% of the days. Data collected for the universe of workers across four labor stands during lean periods indicates that minimum unemployment during this period is 50%.

[10]Figures based on data collected in Varun (2024).

Table 1: Descriptive summary of Data

	Mean	SD	N
Panel A: Negotiation Data			
Fixed Hour contracts	0.69	0.46	1,430
Undercutting on wage	0.27	0.44	1,417
Undercutting - interference	0.52	0.50	1,422
Successful Negotiations	0.84	0.37	1,411
Panel B: Belief Data			
Age	32.07	8.55	843
Education (in years)	3.52	3.86	843
Worker works on fixed work contracts	0.35	0.48	843
Worker works on fixed wage contracts	0.39	0.49	843
Worker works on both type of jobs	0.26	0.44	843

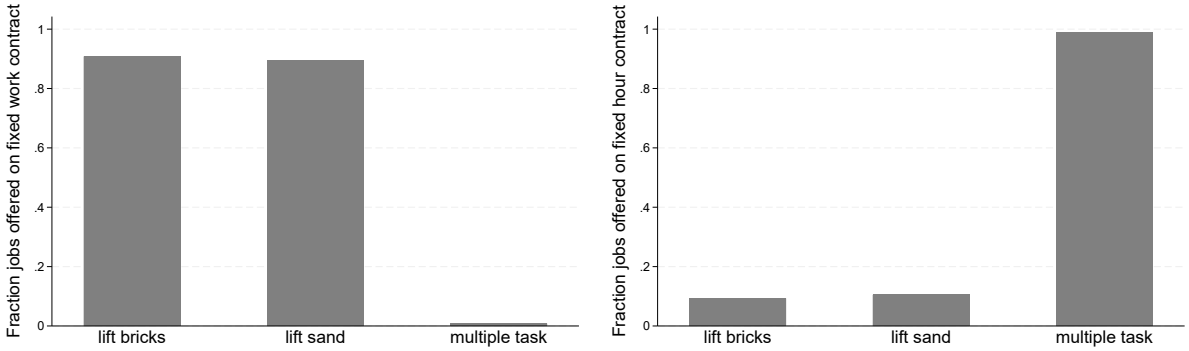
The number of observations in Panel A may vary due to missing data.

as there are different tasks in the job, and each of the tasks is sequential (in the sense of Kremer (1993)), it is difficult to observe the worker perform each task separately. Thus, the multi-tasking model of Holmstrom and Milgrom (1991) would suggest that contracts which don't incentivize individual tasks but instead offer a fixed hour are optimal. Secondly, tasks are performed together with a mason, who is responsible for laying bricks and plastering, and as the mason is hired for the day, the worker is hired for the day as well.

The other type of jobs are those in which there is a single task. The most common type of such jobs are those in which a worker has to lift a certain amount of material (one of sand, bricks, cement or ballast) for some distance. The number of hours are not fixed. These jobs usually involve hiring workers on what we refer to as *Fixed Work* contracts. The workers are paid when the job is completed. This could take the whole day, or a few hours.

Figure 2 shows the relationship between job types and the contracts under which those jobs are offered using the negotiation data. For *multiple task* jobs, firms almost exclusively hire workers on *Fixed Hour* contracts for the day. For single task jobs (two examples being lifting sand or lifting bricks), firms hire workers on *Fixed Work* contracts in 90-91% of the cases. These figures provide strong evidence in favor of the hypothesis that firms prefer to use *Fixed Hour* contracts for jobs involving multiple tasks and *Fixed Work* contracts for jobs with single tasks.

Figure 2: Relationship between job type and contracts



(a) Jobs offered on *Fixed Work* contracts (b) Jobs offered on *Fixed Hour* contracts

Notes: The figure shows data collected at the spot market in which firms offer jobs and contracts to workers.

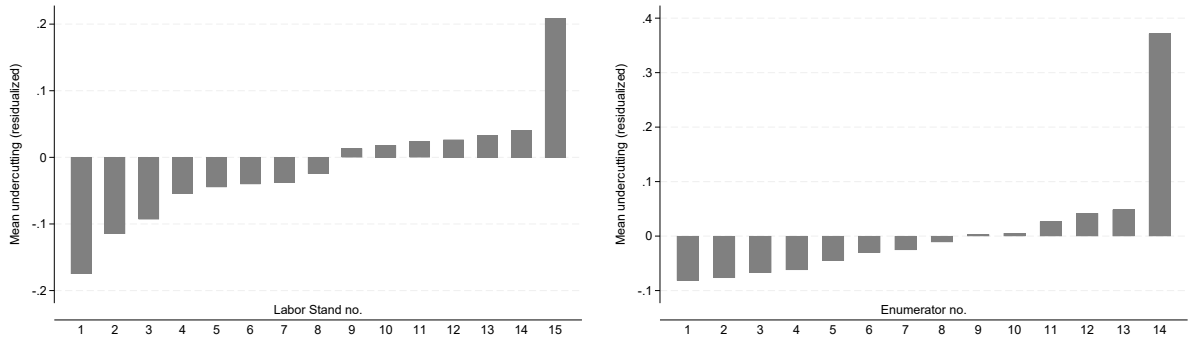
The negotiation process between firms and workers for these different jobs is the same. In both cases, the firms are surrounded by the workers when they arrive at the market to hire. Workers preference for the type of jobs and thereby the contracts may differ. In a separate survey, we ask workers whether they *usually work for multiple task jobs (fixed hour) or work on single task jobs (Fixed Work contracts)*. Table 1 shows the data on preferences. 35% and 39% workers usually work on *Fixed Work* and *Fixed Hour*jobs respectively, and the remaining work on both. Note that workers who prefer to work on one type of contract can also work on other type of jobs, and have knowledge of the going wages for these jobs (see Figure 7, 6).

5.3 Checks on Data

In this subsection, we conduct a set of basic sanity checks on the data to ensure internal consistency and identify any irregularities. These checks help verify that the patterns observed are not driven by data entry errors, misclassification, or unexpected outliers.

Variation in undercutting at market and enumerator level First, we examine the variation in undercutting behavior across labor markets and across enumerators. Specifically, we assess whether certain markets consistently exhibit higher or lower rates of undercutting, which could reflect local labor dynamics, norms, or competition among workers. We also explore whether enumerator-level variation—potentially arising from differences in how negotiations were recorded or interpreted—contributes meaningfully to the observed patterns. This helps us assess the robustness of the undercutting measure and rule out systematic measurement error.

Figure 3: Variation in undercutting at market and enumerator level



(a) Undercutting variation at different labor stands

(b) Undercutting variation for different enumerators

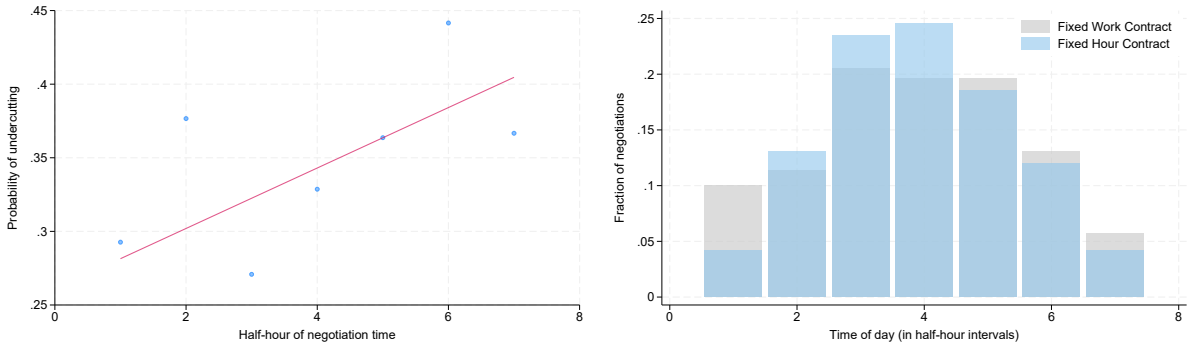
Notes: The figure shows data variation in undercutting at labor stand and enumerator level after residualizing for contract type, success of negotiation and month. We restrict the sample to labor stands with at least 10 observations and enumerators who completed at least 10 negotiations.

Figure 3a presents the variation in undercutting across labor stands, after controlling for contract type, negotiation success, and month of observation. There is considerable heterogeneity at the stand level, with residualized mean undercutting values ranging from approximately –0.2 to 0.2. In contrast, Figure 3b shows the corresponding variation across enumerators. With the exception of one enumerator, the variation at the enumerator level is substantially lower than that observed across labor stands. In subsequent analyses, we demonstrate that our findings on the relationship between undercutting and contract type remain robust even when data from this enumerator are excluded.

Variation in undercutting with time of the day Undercutting behavior may vary systematically over the course of the day. For instance, workers might be more likely to undercut later in the day as their urgency to secure employment increases. Figure 4a supports this idea by showing that the unconditional likelihood of undercutting rises steadily as the day progresses.

To ensure that our main results are not shaped by systematic differences in the timing of negotiations across contract types, we examine when negotiations occur for each type of contract. Figure 4b plots the distribution of negotiation times separately for *Fixed Work* and *Fixed Hour* contracts. The figure indicates that the timing of negotiations is broadly similar across both types, suggesting that time-of-day effects are unlikely to drive the differences in undercutting across contract structures.

Figure 4: Negotiation time, undercutting and contract type



(a) Undercutting and negotiation time

(b) Negotiation time and contract type

Note: Panel (a) illustrates the variation in undercutting over time based on the timing of negotiations between firms and workers. The p-value of the correlation is 0.092. Panel b) plots the distribution of time of negotiation for the two types of contracts. The x-axis represents half-hour intervals, with each point aggregating all negotiations occurring within the corresponding time frame. For reference, the 0 half-hour interval includes negotiations conducted between 07:00 and 07:30 a.m.

6 Undercutting on contracts

Workers searching for work at spot markets incur significant monetary and time costs in reaching the market. The number of workers are in excess of the number of jobs on offer. These conditions suggest that workers are likely to undercut each other till their reservation wage to get the job on offer. However, the data on negotiation shows that workers undercut each other in around 27% of negotiations which seems low for these markets.

In this subsection, we examine how undercutting varies across the two types of contracts offered in these spot markets, as described in the previous subsection. Variation in undercutting between contract types provides insight into how workers determine their reservation wages and how these decisions influence the wage-setting process.

We focus on undercutting across two contract types—*Fixed Work* and *fixed hour*—rather than job types (single-task versus multi-task) for two reasons. First, our model predicts that workers' reservation wages vary with contract type rather than job type. We will present supporting evidence for this hypothesis later in this section, specifically demonstrating that undercutting is higher for single-task jobs offered on *Fixed Work* contracts compared to single-task jobs offered on *Fixed Hour* contracts. This finding highlights that the relevant determinant is contract type, not job type. Second, there is substantial overlap between job types and contract types, as shown in Figure 2, resulting in an almost one-to-one correspondence between them. As a result, analyzing undercutting with job type as the dependent variable would yield findings similar to those obtained using con-

tract type.

We use the specification shown in Equation 6.1 to analyze the relationship between contract type and extent of undercutting. D_{jt} takes the value 1 if the contract for negotiation j on day t is a *Fixed Work* contract, and 0 if it is a *Fixed Hour* contract. γ_s are fixed effects for the success of the negotiation and the labor stand, and Y_{jt} captures whether there was undercutting on wage in negotiation j on day t.

$$Y_{jt} = \alpha + \beta D_{jt} + \mu_t + \gamma_s + \epsilon_{jt} \tag{6.1}$$

Table 2 shows the results for the regression in equation 6.1. Column 1, 2 show the coefficient β in equation 6.1 estimated using data from both successful and unsuccessful negotiations. Workers undercut each other in 21% of *Fixed Hour* contract negotiations. This increases to 39.8% for *Fixed Work* contract negotiations. We use fixed effects of the spot market to account for variation in the undercutting behavior of workers across markets. In column 2, we present results with survey day fixed effects to account for day to day variation in the behavior of workers. In column 5, we compare the percentage amount by which workers undercut each other in *Fixed Hour* and *Fixed Work* contracts. We restrict the sample to those observations in which workers undercut each other on wage. Percent undercut is defined as the difference between the first offer of any worker and the last offer of a different worker (which has to be lower than the first offer) during the negotiation divided by the first offer. The mean for this variable for *Fixed Hour* contracts is 15%, and the coefficient is 5.9 percentage points, suggesting that workers undercut each other by a larger percentage in *Fixed Work* contracts.

In column 3, 4 we restrict our sample to negotiations in which worker and firm successfully negotiated the contract. The extent of undercutting in *Fixed Hour* contracts is higher for successfully negotiated ones than contracts which were not agreed upon. The coefficient of the regression is higher for successful negotiations as well. Figure 5 shows the coefficients from a regression of undercutting on an interaction of contract type with success of the negotiation after accounting for spot market fixed effects. This figure gives us mean level of undercutting for different types of contracts, after removing variation at the spot market level.

In around 92.6% *Fixed Hour* negotiations which are unsuccessful workers don't undercut on wage. This suggests that workers (excluding the first worker who was negotiating) felt that the firm's offer in response to the first worker's offer was unreasonable and not negotiation worthy. For *Fixed Work* contracts, in 27% of unsuccessful negotiations workers tried to undercut each other to arrive at a wage which they felt was reasonable, but

Table 2: Undercutting in *Fixed Work* contracts

	Undercutting				Percent undercut
	All		Successful		
Fixed work contract	0.186***	0.180***	0.180***	0.179***	0.059***
	(0.027)	(0.027)	(0.031)	(0.031)	(0.019)
Observations	1,396	1,395	1,170	1,168	357
Mean for Fixed hour	0.21	0.21	0.24	0.24	0.15
Day Fixed Effect	No	Yes	No	Yes	No

The dependent variable *undercutting* is a binary variable which captures whether any worker tried to undercut another worker on price. *Successful* includes those observations in which the firm and worker were able to complete the negotiation. *Percent undercut* captures the percent difference between any worker's first offer and the agreed upon offer. Percent undercut includes only those observations in which any undercutting happened and for which we observe both the first and the last offer. Standard errors, clustered by date, are in parenthesis. We use fixed effects for labor stand and success of the negotiation for all specifications. In column 5, we control for the first offer of the worker. * p < 0.10, ** p <0.05, *** p<0.01.

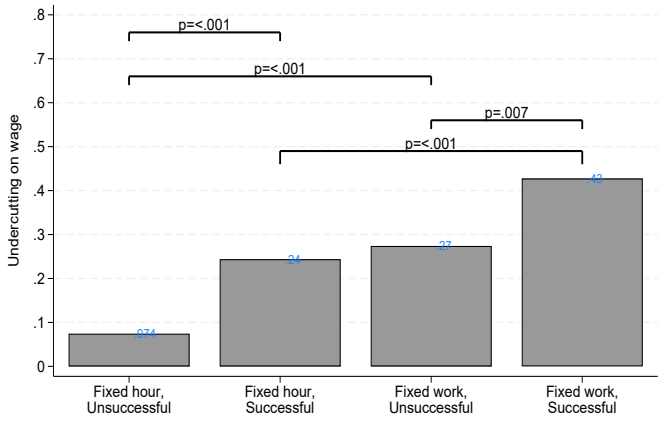
were unable to agree to the terms of the firm. Similar pattern is visible for successful negotiations as well. In 76% of successful *Fixed Hour* negotiations the first worker and firm come to an agreement without any undercutting by other workers. This suggests that there is a reasonable overlap in the beliefs of firms and workers about the fair wage for *Fixed Hour* work. The extent of wage undercutting is around 75% higher in successful *Fixed Work* negotiations.

6.1 Robustness checks

We show robustness checks for our main results in Table 2 in Appendix Section C.

Robustness to contract value and Enumerator fixed effects Even if undercutting imposes some cost on workers, these costs may be outweighed by the monetary value of the contract at stake. A simple conceptual argument would thus suggest that workers may be more willing to undercut each other when competing for higher-value contracts. If *Fixed Work* contracts tend to be more valuable than *Fixed Hour* contracts, this could confound our primary results. To address this possibility, Appendix Table C-1 includes controls for the value of the contract in all negotiations. We define contract value as the final wage offer made by any worker during the negotiation, divided by the number of workers being hired. For *Fixed Hour* contracts, where negotiations typically involve individual workers, the denominator is set to one. For *Fixed Work* contracts, the value is calculated by divid-

Figure 5: Undercutting on wage



Notes: The figure plots coefficients from a regression where the dependent variable is undercutting, and the independent variables are interaction of contract type (*Fixed Hour* or fixed work) with indicator for success of negotiation. We use fixed effects for labor stand. Standard errors are clustered at the day level.

ing the final offer by the total number of workers the employer intended to hire. Once we account for contract value, we find no strong positive association between value and undercutting. Moreover, the estimated effect of contract type on undercutting remains consistent with our main findings reported in Table 2.

Appendix Table C-2 presents the results from our main specification, incorporating enumerator fixed effects and excluding observations collected by one enumerator who exhibited outlier behavior in terms of undercutting. The estimated coefficients remain quantitatively similar, suggesting that our findings are not driven by enumerator-specific patterns.

Robustness to number of workers negotiating Some negotiations in the spot market may not provide an opportunity for undercutting. For instance, a firm might arrive at the market, approach the first worker they see while others observe, and conclude the negotiation without any chance for undercutting. If this negotiation pattern systematically differs between fixed-hour and fixed-work contracts, it could lead to the incorrect conclusion that undercutting is determined by the nature of the contract, when in reality, it may be driven by differences in negotiation patterns. To account for this possibility, we incorporate data on the number of workers present and participating in each negotiation. To address these concerns, we analyze two alternate specifications. In the first, we control for the number of workers actively participating in the negotiation. In the second, we restrict the sample to negotiations where at least two workers were actively involved.

The results shown in Appendix Table C-3 highlight that undercutting is higher and

statistically different for *Fixed Work* contracts when compared to *Fixed Hour* contracts even when we control for number of workers. However, the coefficient decreases significantly when we control for number of workers negotiating, and the extent of undercutting is strongly correlated with the number of workers negotiating. When we restrict the sample to negotiations in which at least one worker was present (and don't control for number of workers) our results remain quantitatively similar to our primary specification. This suggests that even when there is a possibility of undercutting (due to presence of more than one worker) the extent of undercutting is higher in *Fixed Work* jobs, but the number of workers negotiating on average is higher in *Fixed Work* jobs which decreases the coefficient.

However, it is important to note that being present and participating in a negotiation does not necessarily imply that *undercutting interference* is occurring. A worker may be present and participate only after the negotiation with the first worker has concluded (e.g., if the initial negotiation was unsuccessful).

Robustness to time of negotiation A potential alternative explanation for the observed pattern of undercutting is that negotiations for *Fixed Work* and *Fixed Hour* contracts may systematically occur at different times of the day, potentially influencing workers' willingness to undercut. For example, as the day progresses and workers become more anxious to secure employment, they may be more likely to accept lower wages. As shown in Figure 4a, the unconditional probability of undercutting increases over the course of the day. To account for this, Appendix Table C-4 incorporates controls for the timing of the negotiation in our main specification. The results remain quantitatively similar, suggesting that our findings are not driven by differences in the timing of negotiations across contract types.

Undercutting across job types vs contract types Our analysis in Table 2 examines contract type as the primary source of variation in undercutting behavior. However, it is possible that job type, specifically whether a job involves a single task or multiple tasks, may instead be the underlying factor driving differences in undercutting. This possibility arises due to the observed correlation between job type and contract type. Single-task jobs are predominantly offered on *Fixed Work* contracts, while multi-task jobs are more commonly associated with *Fixed Hour* contracts (see Figure 2).

To isolate the effect of contract type from that of job type, we make use of cases where contract type varies within the same job type. In particular, we focus on single-task jobs that are offered under both *Fixed Work* and *Fixed Hour* contracts. As shown in Figure 2,

approximately 10 percent of lifting sand or bricks jobs, which are single-task in nature, are offered on *Fixed Hour* contracts. This variation allows us to compare undercutting behavior across contract types while holding job type constant.

The results, presented in Table 3, show that undercutting is higher in *Fixed Work* contracts compared to *Fixed Hour* contracts, even within the same category of single-task jobs. These findings suggest that contract type, rather than job type, is the more relevant margin along which undercutting behavior varies.

Table 3: Undercutting across contract type in single task jobs

	Undercutting		Percent undercut
	All	Successful	
Fixed work contract	0.1891**	0.1714*	0.0631
	(0.0900)	(0.0993)	(0.0501)
Observations	282	228	108
Mean for fixed hour	0.24	0.27	0.17
Day Fixed Effect	No	No	No

The sample consists of jobs which involved lifting bricks or sand. The dependent variable *undercutting* is a binary variable which captures whether any worker tried to undercut another worker on price. *Successful* includes those observations in which the firm and worker were able to complete the negotiation. *Percent undercut* captures the percent difference between any worker's first offer and the agreed upon offer. Percent undercut includes only those observations in which any undercutting happened and for which we observe both the first and the last offer. Standard errors, clustered by date, are in parenthesis. We use fixed effects for the success of the negotiation for all specifications. In column 3, we control for the first offer of the worker. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6.2 Understanding the difference in undercutting across contract types

There is a significant difference in the extent of undercutting by workers across different contracts. What accounts for this difference? Workers undercut one another when their reservation wage is below the current standing offer. The extent of undercutting therefore depends on two forces: the distribution of reservation wages across workers competing for a given job, and any non-monetary costs associated with undercutting (such as social sanctions or moral costs of accepting a wage below what one considers fair). We examine the role of social norms in the next subsection, after presenting the seasonal evidence. We then develop a model in Section 7 that formalizes how contract structure shapes the reservation wage distribution, and test its predictions in Section 8.

6.3 How does undercutting vary across lean and peak seasons?

The construction industry experiences a significant slump in demand during the monsoon season, as the risk of rain makes outdoor construction costly. This season typically begins in mid-July or early August and lasts until the end of September. Since construction constitutes the majority of labor demand at stands, the overall demand for labor declines during this period. We analyze how the extent of wage undercutting varies between the peak construction season (January to July) and the lean construction season (August and September). As the demand for labor—or the availability of work—decreases in the market, workers face a lower probability of securing employment. Consequently, they may become more likely to undercut wages to obtain work. In Table 4, we test this hypothesis using the following specification:

$$Y_{jt} = \alpha + \beta L_{jt} + \mu_t + \gamma_s + \epsilon_{jt} \tag{6.2}$$

L_{jt} takes the value 1 if the negotiation j on day t is during the lean season, and 0 if it is during the peak season. γ_s are fixed effects for the success of the negotiation, the spot market, and the contract type and Y_{jt} captures whether there was undercutting on wage in negotiation j on day t.

Our analysis considers two definitions of the lean season: one assumes the monsoon begins in August, while the other assumes it starts in the second half of July. In column 1 of Table 4 we find that undercutting is higher during lean season (when it is assumed to begin in August) by around 40%. In column 2, we find how undercutting varies across seasons for *Fixed Work* and hour contract. The omitted variable is *peak season for fixed hour* contract, and all coefficients are with respect to that. The undercutting for *Fixed Hour* contracts increases by 7 ppt (from a baseline of 17 ppt during peak season) and by 11 ppt (from a baseline of 34%) for *Fixed Work* contracts. Both these increases are statistically significant at 5% level. Notably, the absolute gap in undercutting between *Fixed Work* and *Fixed Hour* contracts widens during the lean season: the difference rises from 17 percentage points during the peak season to 21 percentage points during the lean season. In column 3, we restrict our sample to the labor stands which were surveyed during both the lean and peak seasons. Our results hold for this specification. However, the percentage increase in undercutting is smaller (33% compared to 40%) under this restriction. Columns 4–6 repeat this analysis under the assumption that the lean season begins in mid-July. The results remain robust under this specification.

If workers are undercutting at a higher rate during the lean season, one expected consequence would be a higher rate of successful negotiations during this period. This hy-

pothesis is tested in Columns 7 and 8 of Table 4, where we find a significant increase in negotiation success during the lean season.

Table 4: Undercutting across seasons

	Undercutting						Neg. Successful	
	After August 1			After July 15			August	July 15
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lean Season	0.086***		0.084***	0.049**		0.060**	0.106***	0.063**
	(0.027)		(0.027)	(0.024)		(0.028)	(0.025)	(0.026)
Peak Season - Fixed work		0.163***			0.146***			
		(0.037)			(0.043)			
Lean Season - Fixed hour		0.071**			0.029			
		(0.028)			(0.025)			
Lean Season - Fixed work		0.278***			0.242***			
		(0.040)			(0.036)			
Observations	1,396	1,396	1,054	1,396	1,396	1,054	1,409	1,409
Mean: Peak Season	0.21		0.25	0.21		0.26	0.81	0.80
Mean: Peak Season X fixed hour		0.171			0.173			
Contract type FE	Yes		Yes	Yes		Yes	Yes	Yes
Nego. Successful FE	Yes	Yes	Yes	Yes	Yes	Yes		
Market FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample Markets	All	All	Overlapping	All	All	Overlapping	All	All
pval - Fixed hour: Peak==Lean		.014			.239			
pval - Fixed work: Peak==Lean		.021			.058			

The dependent variable *undercutting* is a binary variable which captures whether any worker tried to undercut another worker on price. Columns 1–3,7 display the results under the assumption that the lean season begins in August and lasts until the end of September. Columns 4–6,8 present the results when the lean season is assumed to start after July 15 and continue through September. Column 1,3, 4 and 6 shows the results for all contracts, and column 2, 5 shows the extent of undercutting for each contract across lean and peak season. Columns 3 and 6 replicate the specifications of Columns 1 and 4, respectively, but restrict the sample to labor stands surveyed in both the lean and peak seasons. Column 7,8 shows how the probability of negotiation success changes from peak to lean season. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6.4 Can social norms explain the contract-type gap in undercutting?

A natural explanation for the overall low rate of undercutting in these markets is that informal social norms deter workers from accepting wages below the prevailing rate. Breza et al. (2025) document this mechanism in rural agricultural labor markets, where workers who publicly accept below-floor wages face social sanctions from peers. Such norms are plausibly at work in our setting as well, and may account for the fact that undercutting occurs in only 27% of negotiations despite high unemployment. However, the question relevant to this paper is not whether norms suppress the overall level of

undercutting, but whether differential norm enforcement can explain why undercutting is nearly twice as high for *Fixed Work* contracts as for *Fixed Hour* contracts. We present three pieces of evidence suggesting it cannot.

Comparable worker populations across contract types. If differential social norms were driving the gap, we would need workers competing for *Fixed Work* jobs to form a less cohesive or less norm-enforcing group than those competing for *Fixed Hour* jobs. However, the two populations are comparable in size: 35% of workers in our survey typically work on single-task jobs (*Fixed Work*), 39% typically work on multi-task jobs (*Fixed Hour*), and 26% work on both (Table 1). Furthermore, these markets are characterized by worker turnover and limited repeated interaction, weakening the scope for collective norm enforcement in either group. The fact that workers competing for both contract types are drawn from the same pool at the same stands makes it difficult to argue that one group has systematically stronger norms than the other.

The contract-type gap persists within single-task jobs. As shown in Table 3, even within the subset of single-task jobs, undercutting is significantly higher when the job is offered on a *Fixed Work* contract than on a *Fixed Hour* contract. Since these are the same types of jobs performed by overlapping sets of workers, any norms specific to the job type should apply equally. The variation in undercutting tracks contract structure, not the social group associated with the job.

The gap widens during the lean season. The social norms account also makes a prediction about how the contract-type gap should respond to seasonal demand shocks. During the lean season, labor demand falls and workers become more desperate. If norms are the binding constraint, the social cost of undercutting effectively falls, pushing more workers past the undercutting threshold. The number of workers who cross this threshold depends on the density of the reservation wage distribution at the margin. Since *Fixed Hour* contracts produce a more concentrated distribution — as both the model and the beliefs data confirm — there is more mass near any given threshold under these contracts. A uniform reduction in the social cost of undercutting should therefore produce a *larger* percentage point increase in undercutting for *Fixed Hour* contracts than for *Fixed Work* contracts. The data show the reverse. As reported in Table 4 (column 2), undercutting increases by 11 percentage points for *Fixed Work* contracts (from a baseline of 34%) but only 7 percentage points for *Fixed Hour* contracts (from a baseline of 17%). The contract type with the more dispersed distribution — and therefore less mass at the margin — exhibits

the larger response, consistent with seasonal shocks operating through the reservation wage channel identified by our model rather than through uniform erosion of norms.

To be clear, our argument is not that social norms are irrelevant in these markets. Norms likely contribute to the overall low rate of undercutting across both contract types, consistent with Breza et al. (2025). Our claim is narrower: the pronounced gap in undercutting across contract types is better explained by structural differences in reservation wage dispersion, generated by the effort–leisure trade-off, than by differential norm enforcement. We formalize this mechanism in the next section.

7 Theoretical Framework

This section develops a simple model to guide our analysis. We begin by characterizing how workers in our setting determine their reservation wage. We then formalize the bargaining process between firms and workers, highlighting how workers' reservation wages shape the incidence of undercutting during negotiations. The model yields a set of testable predictions, which we take to the data in the following section.

Preliminaries. Worker i has a type θ_i and negotiates with firms for jobs under contracts $j \in \{\text{Fixed hour}, \text{Fixed work}\}$. We denote *Fixed hour* jobs by $j = 0$ and *Fixed work* jobs by $j = 1$. The effort exerted by the worker to complete the job is denoted e_j and the number of leisure hours after the job is completed is denoted $L_j(\theta_i, e_j^i)$.

The reservation wage of a worker for job j is

$$w_j^i = \underbrace{C^i}_{\text{market participation value}} + \underbrace{c(e_j^i)}_{\text{cost of effort } e \text{ in job } j} - \underbrace{g(L_j(\theta_i, e_j^i))}_{\text{value of leisure for } i}, \tag{7.1}$$

where e_j^i is the active effort exerted, L_j is the associated leisure. C^i is a worker level shifter which is separable from effort cost and leisure, and can be interpreted as the baseline value for worker i to participate in the market.

Leisure hours. Leisure is defined as

$$L_j(\theta_i, e_j^i) = 8 - H_j(\theta_i, e_j^i), \tag{7.2}$$

where $H_j(\theta_i, e_j^i)$ is the number of hours required to complete job j. The constant 8 represents a standard working day, reflecting the expectation among most workers that a full

day's work corresponds to eight hours. Effort e_j^i is the number of hours a worker actively exerts within job j, distinct from H_j, the total hours required for completion.

Assumption 1. *In a Fixed Hour job the required hours are fixed:* $H_0(\theta_i, e_0^i) = 8, \quad \forall i.$

Assumption 2. *In a Fixed Work job the hours required are decreasing in both type and effort: (i)* $\frac{\partial H_1(\theta_i, e_1^i)}{\partial \theta} < 0$, *(ii)* $\frac{\partial H_1(\theta_i, e_1^i)}{\partial e_1^i} < 0$.

Assumption 1 implies that leisure hours are zero in Fixed Hour jobs. Assumption 2 implies that leisure in Fixed Work jobs is increasing in type and effort. In Fixed Hour jobs, workers obtain breaks between tasks, whereas in Fixed Work contracts breaks reduce available leisure.[11]

Assumption 3. *The cost of effort* $c(e_j^i)$ *is convex in effort.*

This implies that marginal effort becomes increasingly costly, capturing fatigue or diminishing physical capacity.

Assumption 4. *Workers in Fixed Work jobs (*$j = 1$*) are compensated only if the task is completed.*

Assumption 5. *Workers in Fixed Hour jobs (*$j = 0$*) are compensated only if* $e_0^i \geq \underline{e_0}$.

This assumption rules out trivial shirking.

Assumption 6. *The monetary value of consumption* C^i *is independent of type* θ_i.

Choosing effort. Worker i chooses e_i^j in each job j by maximizing utility subject to Assumptions 4 and 5. It follows:

Lemma 1 (Fixed Hour Contracts)**.** *All workers exert the same effort in Fixed Hour jobs, namely* $e_0^i = \underline{e_0}$ *for all* i. *As a result, the reservation wage distribution in Fixed Hour contracts is*

$$w_0^i = C^i + c(\underline{e_0}).$$

Lemma 2 (Fixed Work Contracts)**.** *In Fixed Work jobs (*$j = 1$*), the worker's optimal effort choice satisfies*

$$c'(e_1^i) = g'(L) \cdot \frac{\partial L}{\partial e_1^i}, \qquad \forall i,$$

that is, each worker equates the marginal cost of effort to the marginal value of the additional leisure it generates. Consequently, the reservation wage distribution in Fixed Work contracts is

$$w_1^i = C^i + f(\theta_i).$$

[11] These break between tasks do not count towards the leisure L.

Proposition 1. *In Fixed Work jobs, higher type workers have lower reservation wages.*

Proof. See Appendix □

Theorem 1. *Let F_j denote the reservation wage distribution under contract type $j \in \{0, 1\}$, with probability mass function $p_j(w)$ at wage w. Then the reservation wage distribution for Fixed Work contracts ($j = 1$) is more dispersed than that for Fixed Hour contracts ($j = 0$), both in terms of variance and in terms of Rényi entropy of order 2 (Renyi (1961)). Formally,*

$$\mathrm{Var}(w_1^i) \;>\; \mathrm{Var}(w_0^i) \quad \textit{and} \quad E_2(F_1) \;>\; E_2(F_0),$$

where

$$E_2(F_j) \;=\; -\ln\left(\sum_w p_j(w)^2\right).$$

See Appendix for Proof.

7.1 Bargaining and undercutting

We now describe how undercutting arises in the bargaining process. A firm arrives at the stand, announces the job and the contract type $j \in \{0, 1\}$, and is surrounded by $m \geq 2$ workers. In the first stage, one worker is chosen at random to state her desired wage:

$$\widehat{W}_{1j} \;=\; w_j^1 + \eta_1,$$

where w_j^1 is the reservation wage derived above and $\eta_1 \geq 0$ is a small idiosyncratic markup or anchoring term (drawn from H, independent of w_j^1).

In the second stage, all remaining $m - 1$ workers simultaneously decide whether they can profitably undercut $\widehat{W}_{1j}$. Wages are quoted on a discrete grid with tick size $\tau > 0$ (e.g., multiples of 10 or 50 rupees), and any undercutting attempt entails a friction $\kappa > 0$, capturing bargaining costs or social disapproval of wage cutting. Worker i can profitably undercut if

$$w_j^i \;\leq\; \widehat{W}_{1j} - \tau - \kappa,$$

in which case she announces $\widehat{W}_{1j} - \tau$. If multiple workers undercut, the employer hires the one offering the lowest wage (ties broken arbitrarily). If no worker can profitably undercut, the firm either hires at $\widehat{W}_{1j}$ or departs without hiring.

This two-stage protocol captures the same intuition as a sequential bargaining process, in the sense that both frameworks rely on workers comparing their reservation wages to

the current standing offer and deciding whether to cut below it. Our formulation simplifies matters by ending the process once a first undercut occurs, so that the only object of interest is the probability of an undercut, rather than the full distribution of possible counter–offers.

Undercutting probability. Conditioning on the first stated wage $\widehat{W}_{1j} = w$, the probability of undercutting is

$$\mathrm{P}(\text{undercutting} \mid \widehat{W}_{1j} = w) \;=\; 1 - \Big(1 - F_j(w - \tau - \kappa)\Big)^{m-1}, \tag{7.3}$$

where F_j is the cdf of the reservation wage distribution. Unconditioning over $\widehat{W}_{1j} = w_j^1 + \eta_1$ with $w_j^1 \sim F_j$ and $\eta_1 \sim H$ yields

$$U_j(m, \tau, \kappa; F_j, H) \;=\; \mathbb{E}_{w \sim F_j,\, \eta \sim H}\left[1 - \Big(1 - F_j(w + \eta - \tau - \kappa)\Big)^{m-1}\right]. \tag{7.4}$$

Hence U_j increases in m and in the markup η, and decreases in the tick size τ and the friction κ. It is also larger when F_j places more mass well below the typical stated wage.

7.2 Undercutting in Fixed Work and Fixed Hour contracts

The bargaining protocol described above implies that undercutting depends on the distribution of reservation wages that workers bring to the stand. From the primitives we have

$$w_0^i = C^i + c(e_0), \qquad w_1^i = C^i + f(\theta_i),$$

with $f'(\theta_i) < 0$ by Proposition 1. Under Assumption 6 ($C^i \perp \theta_i$), reservation wages in Fixed Hour contracts depend only on C^i, while reservation wages in Fixed Work contracts incorporate heterogeneity from both C^i and θ_i.

Theorem 1 establishes the implication of this structural difference: the distribution of reservation wages in Fixed Work is more dispersed than in Fixed Hour, both in terms of variance and in terms of Rényi entropy of order 2. Greater dispersion makes it less likely that workers cluster on the same grid points, and thus more likely that at least one worker can profitably undercut. In the next step we show how these two features— dispersion and collisions on the discrete wage grid—jointly determine undercutting probabilities.

Dispersion in reservation wages. Although observed wages lie on a discrete grid, the underlying heterogeneity in C^i and θ_i can be modeled as continuous. In a location–scale

framework, greater dispersion of the latent distribution translates into a higher probability of undercutting in (7.4). The following proposition formalizes this result.

Proposition 2 (Dispersion and undercutting)**.** *Fix the number of workers $m \geq 2$, tick size $\tau > 0$, undercutting friction $\kappa > 0$, and an idiosyncratic markup $\eta \in [0, \bar{\eta}]$ with $\bar{\eta} < \tau + \kappa$. Suppose latent reservation wages take the location–scale form*

$$w_j^{*,i} = \mu_j + \sigma_j Z_i,$$

where μ_j is the contract–type–specific location parameter, $\sigma_j > 0$ is the dispersion parameter, and $\{Z_i\}$ are i.i.d. draws from a continuous distribution with cdf Φ. Observed stated wages are obtained by rounding latent wages to the nearest admissible grid point:

$$w_j^i = \mathcal{R}_\tau(w_j^{*,i}),$$

where $\mathcal{R}_\tau(\cdot)$ denotes rounding to the grid with tick size τ. Let U_j denote the undercutting probability defined in (7.4). Then U_j is strictly increasing in the dispersion parameter σ_j. In particular, if $\sigma_1 > \sigma_0$, then $U_1 > U_0$.

Proof. See Appendix. □

This result implies that the greater variance of reservation wages in Fixed Work leads directly to a higher probability of undercutting relative to Fixed Hour.

Discrete wage grid and collisions. In the bargaining process, undercutting requires that at least one worker can profitably state a wage strictly below the current best wage. Whether such opportunities arise depends not only on the overall dispersion of the wage distribution, but also on how workers distribute their responses across the discrete grid of admissible wages (for instance, multiples of 10 or 50 rupees). When many workers cluster on the same wage points, ties become frequent. In such cases, even if the underlying distribution of reservation wages is dispersed, the effective scope for undercutting is reduced: a new worker is more likely to repeat the prevailing wage rather than state a distinct, lower one. Conversely, if workers spread their stated wages more evenly across different grid points, ties are less common and the chance of a profitable cut increases. To capture this feature formally, we use the *collision probability*

$$C_j = \sum_w p_j(w)^2,$$

where $p_j(w)$ is the probability mass that distribution F_j assigns to wage w.

Proposition 3 (Collision probability and undercutting). *Let X_j denote the stated wage for contract type j with pmf $\{p_j(w)\}_{w\in\mathcal{W}}$ on a finite grid $\mathcal{W}$, and define the collision probability*

$$C_j = \sum_{w\in\mathcal{W}} p_j(w)^2.$$

Consider the two-stage protocol with $m \geq 2$ workers: one worker is chosen at random to state the first wage X_j, and the remaining $m-1$ workers draw i.i.d. stated wages $\{X'_k\}_{k=1}^{m-1}$ from the same pmf and undercut iff $X'_k < X_j$. Let U_j be the probability that at least one undercut occurs. Then

$$U_j \;\leq\; 1 - \left(\frac{1+C_j}{2}\right)^{m-1},$$

and the right-hand side is strictly decreasing in C_j.

Proof. See Appendix □

Because the Fixed Work distribution typically places probability mass on a larger set of distinct wages than the Fixed Hour distribution, we have $C_1 < C_0$, and therefore $U_1 > U_0$.

Overall undercutting. While undercutting is systematically more prevalent in Fixed Work than in Fixed Hour contracts, the overall incidence remains modest. The model identifies two mechanisms that limit the frequency of undercutting. First, profitable cuts must exceed both the discrete wage increment τ and the bargaining friction κ, which eliminates many potential opportunities for adjustment. Second, anchoring markups η raise the initial wage stated in negotiations, but this effect is only partially offset because firms typically query only a small number of workers, restricting the scope for subsequent counter–offers. Taken together, these features generate a bargaining environment in which undercutting occurs, but only infrequently, consistent with the modest rates observed in the data.

We will evaluate the empirical validity of Theorem 1 and Propositions 1-3 using our data. These tests provide a direct way to examine whether the key predictions of the model are borne out in practice, and thereby serve as an empirical validation of the theoretical framework.

8 Testing the model predictions

In this section we will test the results from the model using the data that we collect on beliefs of workers about their reservation wage.

8.1 Testing Theorem 1

Table 5 and Figures 6–7 present evidence on the distribution of beliefs about going and reservation wages under different contract types. Theorem 1 predicts that reservation wages for Fixed Work contracts should be more dispersed than for Fixed Hour contracts, both in terms of variance and in terms of entropy.

Figure 6 shows the distribution of beliefs for *Fixed Hour* jobs, where workers are hired for 8 hours per day. The support of both the going wage and reservation wage distributions is very narrow, with most mass concentrated around a few grid points.[12] This clustering is also reflected in the low standard deviation (40.85) and entropy (1.06) reported in Table 5. The cumulative distribution in Panel (c) shows that the going wage stochastically dominates the reservation wage, suggesting that workers may be willing to accept offers below what they believe to be the prevailing market wage.

Table 5: Standard Deviation and Entropy of Reservation Wages by Contract Type and Task

Contract / Task	Std. Dev.	Entropy
Fixed Hour	40.85	1.06
Fixed Work (Lifting Sand)	306.619	1.88
Fixed Work (Lifting Bricks)	315.944	1.834

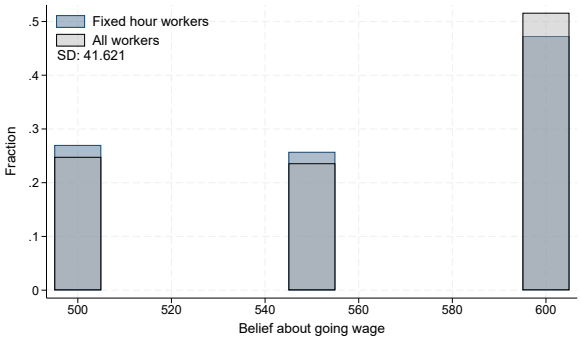
Notes: $Entropy = -\ln\left(\sum_w p(w)^2\right)$. Estimates are based on survey responses to the question: *"What is the minimum amount of money you would accept for XX work?"*.

There is not a lot of difference in beliefs over wages between workers who report doing *Fixed Hour* jobs on a regular basis (39% of the sample as shown in Table 1) and the full set of workers. The reported going and reservation wage is slightly lower on average for those who do these jobs at a higher frequency. By contrast, Figure 7 shows beliefs for two types of *Fixed Work* contracts: lifting sand and lifting bricks. In both cases, the distributions of going and reservation wages are far more spread out, with substantial mass across a wider range of values.[13] Table 5 confirms this pattern: the Standard Deviation of reservation wages is around 307 for lifting sand and 316 for lifting bricks, nearly an order of magnitude larger than for Fixed Hour jobs. Entropy values are also much higher (1.88 and 1.83, respectively), indicating that workers' responses are more dispersed across grid points and collisions are less frequent.

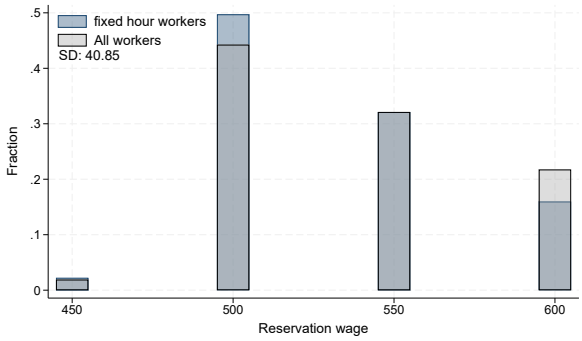
Taken together, these patterns provide direct support for Theorem 1. Reservation wages under Fixed Work contracts are systematically more dispersed—both in Standard

[12] Histograms use 10 INR bins.
[13] Histograms use 50 INR bins.

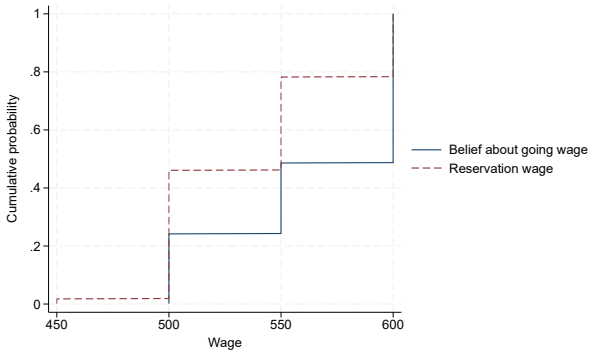
Figure 6: Distribution of beliefs about going wage of *Fixed Hour* work



(a) Going wage



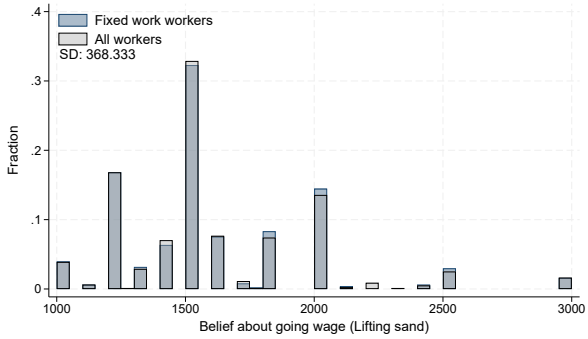
(b) Reservation wage



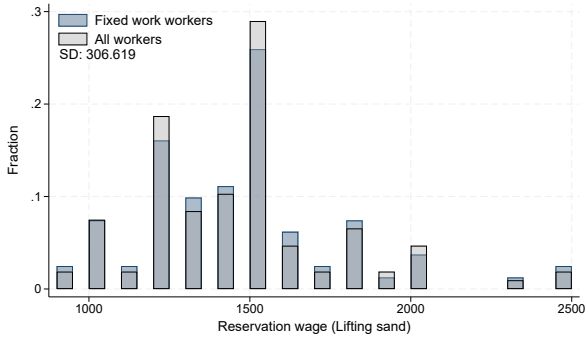
(c) Cumulative distribution

Notes: The figure shows data from a survey of workers conducted between May-August 2024. Panel a captures response to the question: *What is the prevailing wage in the market for daily wage work?*. Panel b captures response to the question: *What is the minimum amount of money you would accept for daily wage work?*. Each bar captures response within a width of 10 INR. Data is winsorized at 1%.

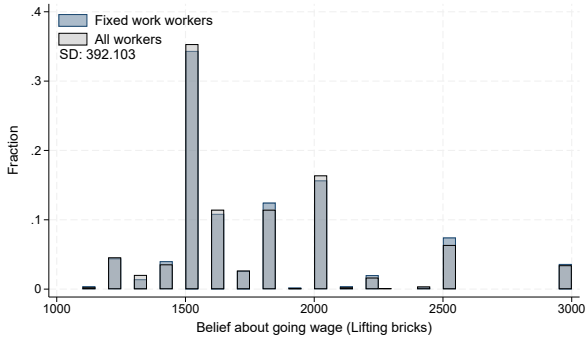
Figure 7: Distribution of beliefs about wage for *Fixed Work* contracts



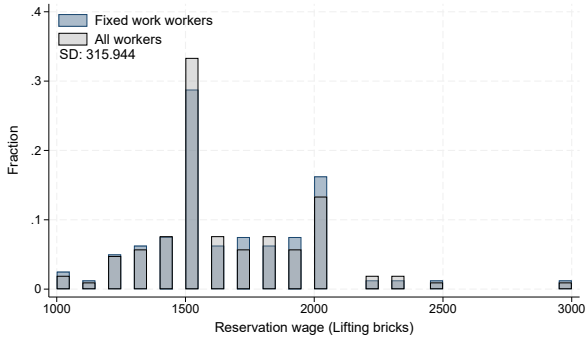
(a) Lifting sand - going wage



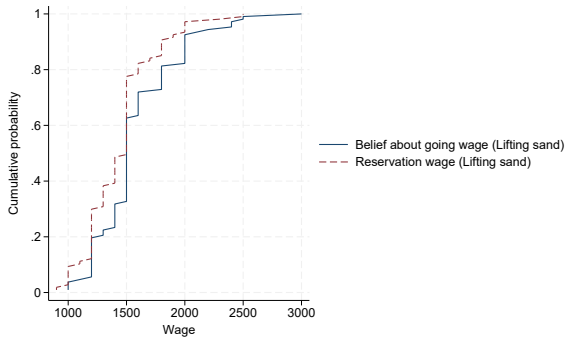
(b) Lifting sand - reservation wage



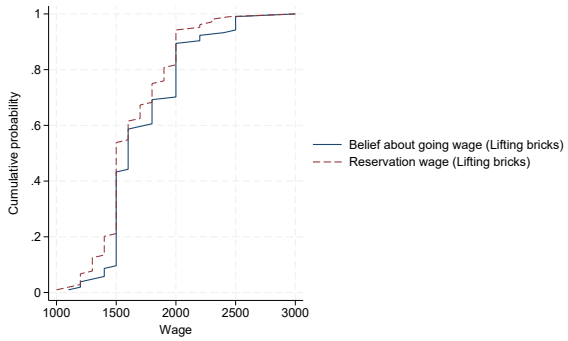
(c) Lifting bricks - going wage



(d) Lifting bricks - reservation wage



(e) Lifting sand - cumulative distribution



(f) Lifting brick - cumulative distribution

Note: The figure shows data from a survey of workers conducted between May-August 2024. Panel A, B captures the response to the question: *What is the prevailing wage/reservation wage for lifting one trailer of sand till 2 floors?*. Panel C, D captures the response to the question: *What is the prevailing wage/reservation wage for lifting one trailer of bricks till 2 floors?*. Each bar captures response within a width of 50 INR. Data is winsorized at 1%.

Deviation and in entropy—than under Fixed Hour contracts. This greater dispersion implies a higher probability of undercutting in bargaining, consistent with the predictions of the model. Finally, although average stated wages for Fixed Work contracts are higher, this reflects the fact that such jobs are typically performed by groups of workers. Once divided among the team, the implied per-worker returns are broadly comparable to those in Fixed Hour jobs.

Robustness: There might be concerns that beliefs about wages may vary across labor stands and the variation we see is driven by the stands and not by individual workers. To ensure this is not the case we adjust wages by demeaning the labor stand effect and show the figures in Appendix Figure B-2, B-1. The distribution and standard deviation are similar to what we see in our main figures.

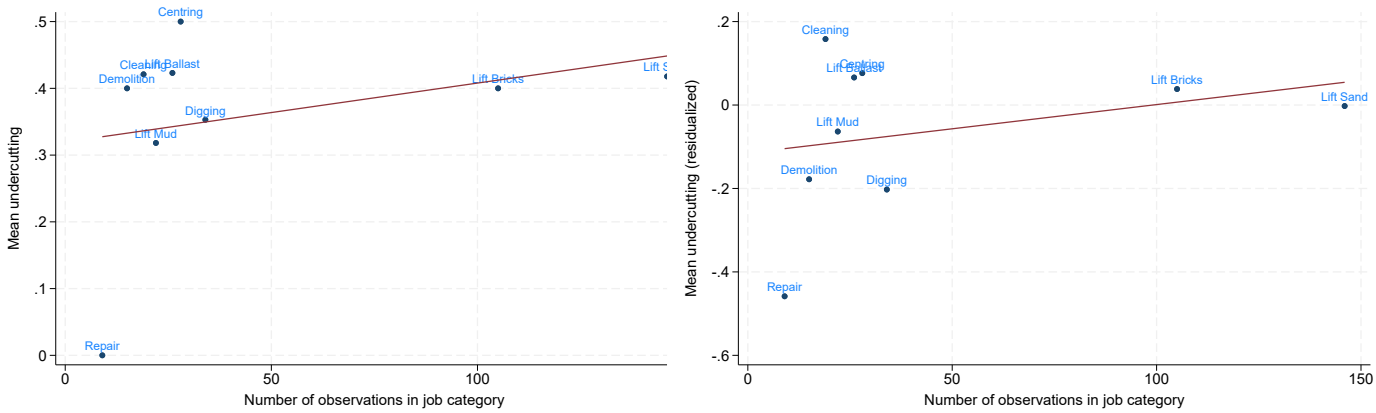
An additional concern is that the distribution may be a reflection of experience. More experienced workers would have a better sense of the reservation wage for a job, and if the distribution for these workers is significantly different from less experienced workers then the variation may be explained by norms being weaker among less experienced workers. To verify if this is the case we plot the distribution separately for experienced workers. We use age as a measure of experience and classify those below the age of 25 as less experienced. Appendix Figure C-1 shows the figure analogous to Figure 7 for workers of different experience. While the variance for less experienced workers is higher, in quantitative terms the standard deviation is similar across all jobs for less experienced and experienced workers. Appendix Figure C-2 reinforces this assessment. We plot the standard deviation of reservation wage with the age of the respondent. While there is a decline in Std. Dev. with experience, the quantum of decline is small when compared to the variance of the fixed hour distribution.

We present the distribution of actual wages quoted in our negotiation data in Appendix Figure C-3. The overall pattern of the distribution, as well as the difference in variance between *Fixed Hour* and *Fixed Work*, is similar to what we observe in Figures 7 and 6.

Alternative Explanations An alternative explanation for the observed pattern of undercutting is that workers' beliefs about appropriate wage levels may still be evolving, particularly for job types that occur infrequently. Our model assumes that workers hold relatively stable beliefs about the reservation wage associated with different jobs. However, if workers have limited exposure to certain job types, especially those that are rare, they may form imprecise beliefs about expected wages. This concern is especially relevant

for *Fixed Work* jobs, which are less common than *Fixed Hour* jobs (see Table 1).

To assess whether our results are driven by this form of belief imprecision, we examine variation in job frequency within the set of *Fixed Work* contracts. In Figure 8, we plot the undercutting rate for each job type under *Fixed Work* contracts against the number of observed negotiations for that job. If imprecise beliefs were driving higher undercutting, we would expect to see a negative relationship between job frequency and undercutting. However, the figure shows a positive correlation between the two. This pattern is inconsistent with the explanation that undercutting arises primarily due to uncertainty stemming from limited exposure to particular job types.



(a) Mean Undercutting

(b) Residualized Mean of Undercutting

Figure 8: Correlation between number of observations in a job and undercutting.

Note: Figure shows the correlation between the number of observations for job types within *Fixed Work* contracts and the extent of undercutting. The line plots the linear fit of a regression of undercutting rate on the number of observations. Panel A shows this relation for raw means of undercutting and Panel B shows this relation after residualizing market level, surveyor and month fixed effects.

8.2 Testing Propositions 1, 2, 3

Figures 6 and 7 showed that beliefs about wages are considerably more dispersed for Fixed Work jobs than for Fixed Hour jobs. Propositions 2 and 3 predict that greater dispersion in the distribution of reservation wages should translate into a higher probability of undercutting. We test this prediction by linking undercutting behavior in the negotiation data to the dispersion of workers' beliefs about wages for different tasks.

We begin with three job types: plastering (a multi-task job typically offered on a Fixed Hour contract), lifting sand (a single-task Fixed Work job), and lifting bricks (another single-task Fixed Work job). For sand and brick lifting, we focus on jobs requiring loads to be carried up to two floors and compute the standard deviation of reservation wages

from the beliefs data. Columns 1 and 2 of Table 6 show a strong positive relationship between undercutting and this measure of dispersion in going wages.

We then refine the analysis by restricting the negotiation data to exactly those floor levels for which belief data are available. This yields five job types: plastering, lifting sand to floors 2 and 4, and lifting bricks to floors 2 and 4. Columns 3 and 4 of Table 6 confirm that the positive correlation between undercutting and dispersion in beliefs remains robust in this more granular sample.

Overall, these results provide direct support for Propositions 2 and 3. When workers can increase leisure by working more quickly (as in Fixed Work contracts), differences in ability become more salient. High-ability workers lower their reservation wages by completing tasks faster, which increases the dispersion of the distribution and raises the probability of undercutting. By contrast, in Fixed Hour contracts all workers are constrained to supply the same number of hours, limiting heterogeneity in reservation wages and reducing the scope for undercutting. Appendix Table C-6 shows that the same patterns hold when using entropy as the dispersion measure.

Table 6: Undercutting and Standard Deviation of wage distribution

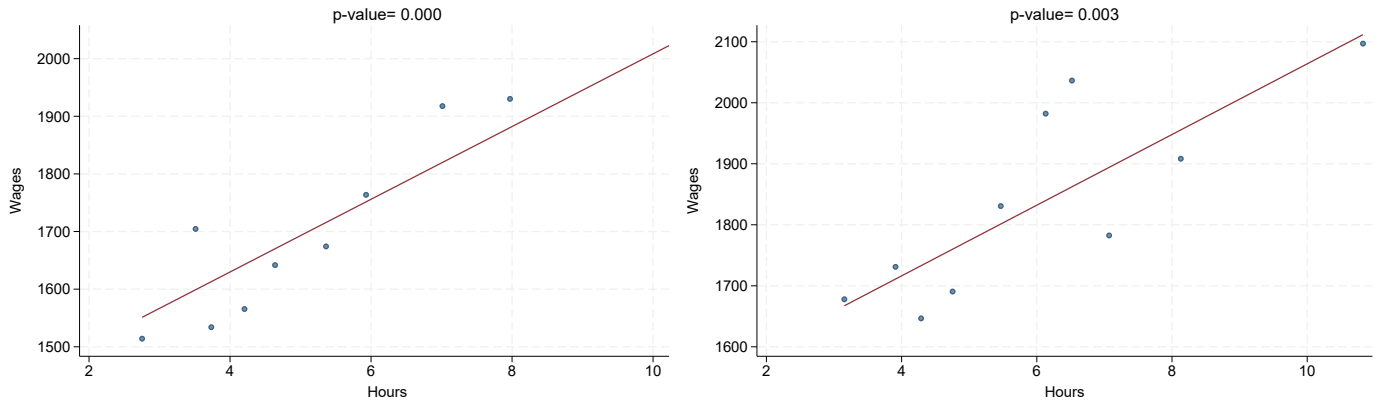
	Undercutting			
	All Sample		Appropriate Floor Sample	
Std Dev.	0.00058***	0.00058***	0.00033***	0.00032**
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	694	691	521	512
Day Fixed Effect	No	Yes	No	Yes

The dependent variable *undercutting* is a binary variable which captures whether any worker tried to undercut another worker on price. The independent variable is standard deviation for the going wage of the job calculated from the beliefs data. Column 1 and 2 have three types of jobs - plastering, all jobs involving lifting sand, all jobs involving lifting bricks. Column 3,4 include 5 type of jobs – plastering, lifting sand till floor 2, lifting sand till floor 4, lifting brick till floor 2, lifting bricks till floor 4. Standard errors, clustered by date, are in parenthesis. We use fixed effects for labor stand and success of the negotiation for all specifications. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Testing Proposition 1 Proposition 1 predicts that higher–type workers in *Fixed Work* contracts should have lower reservation wages. The mechanism is that more productive workers complete the task more quickly and therefore attach greater value to the additional leisure time, accepting lower wages in exchange. While our data do not contain a direct measure of worker "type," we ask workers to report the number of hours they would require to complete a given job. In the model, higher–type workers correspond to

those who can finish the job in fewer hours, so reported completion time provides a natural proxy for type. If Proposition 1 is correct, we should observe a positive correlation between reported hours and reservation wages.

Figure 9 tests this prediction. The figure plots binned scatterplots of reservation wages against self-reported hours to complete the task, separately for lifting sand and lifting bricks up to two floors. In both tasks, there is a strong positive relationship: workers who report taking longer also report higher reservation wages. Reported p-values (0.000 for sand and 0.003 for bricks) confirm the statistical significance of this correlation. These findings are consistent with the model's prediction that higher–ability workers—those who can finish faster—accept systematically lower reservation wages.



(a) Lifting Sand to 2 Floors

(b) Lifting Bricks to 2 Floors

Figure 9: Correlation between (self-reported) hours of completion and reservation wage

Note: Figure shows the correlation between the (self-reported) number of hours required to complete a job and the reservation wage for the job for two different *Fixed Work* jobs. The number of hours are in response to the question: *What is the time that it will take two workers to lift 1 trailer sand/bricks till 2 floors?* Each panel shows a binned scatterplot of wages (vertical axis) against hours (horizontal axis), netting out market fixed effects. The sample is divided into 10 equal-sized bins of the residualized regressor, and the mean wage within each bin is plotted. The total number of observations are 134. Circle markers correspond to these binned means, and the solid line shows the best-fit linear relationship estimated in the corresponding regression. Reported p-values are from the underlying regression of wages on hours with market fixed effects. We winsorize the wages and reported time at 1%.

Figure 9 uses self-reported completion time as a proxy for ability, which is only available for *Fixed Work* jobs. To test whether the ability–reservation wage relationship is specific to *Fixed Work* contracts, as the model predicts, we use worker age as an alternative proxy for ability and examine reservation wages across both contract types. In manual construction labor, older workers have more experience and are typically more efficient at completing tasks. Under the model, this should matter for *Fixed Work* contracts, where faster completion translates into more leisure and therefore a lower reservation wage. For *Fixed Hour* contracts, where all workers commit to the same number of hours regardless of ability, age should have no systematic relationship with reservation wages.

Figure 10 confirms this prediction. Standardized reservation wages for *Fixed Hour* contracts are approximately constant across age groups. By contrast, reservation wages for both *Fixed Work* jobs decline monotonically with age: young workers (18–24) report substantially higher reservation wages than workers aged 30 and above. The decline is inconsistent with a learning account in which inexperienced workers hold imprecise but unbiased beliefs about prevailing wage norms. Instead, the pattern is consistent with the model: as workers gain experience, they complete tasks more quickly, value the resulting leisure, and accept lower reservation wages. That this relationship is absent for *Fixed Hour* contracts, where completion time is irrelevant, provides suggestive evidence that the effort–leisure channel operates only when hours are endogenous.

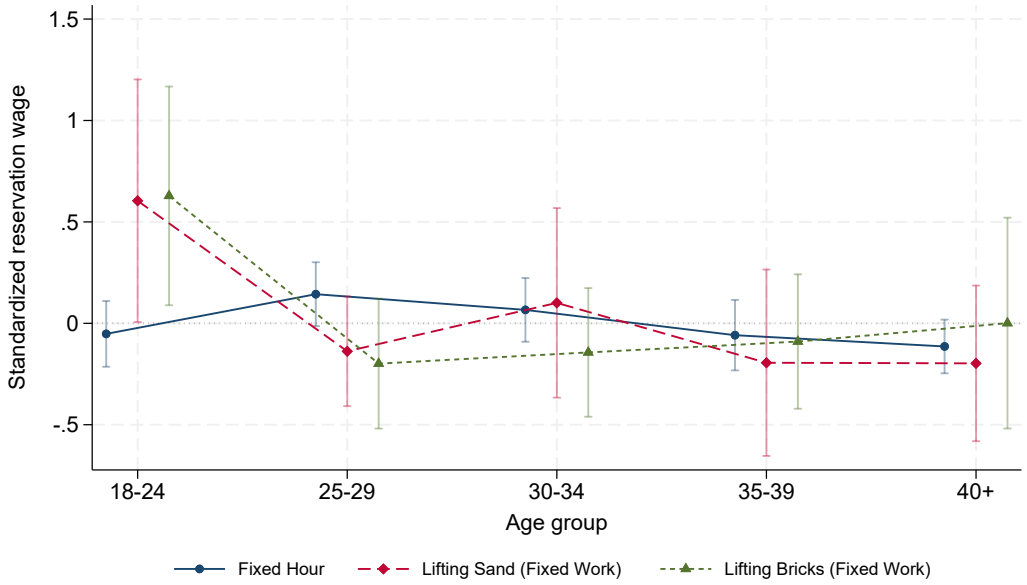


Figure 10: Reservation wage by age and contract type

Note: The figure plots mean standardized reservation wages by age group, separately for *Fixed Hour* contracts and two *Fixed Work* jobs (lifting sand and lifting bricks to two floors). Reservation wages are residualized for market fixed effects and then standardized to place all three job types on a comparable scale. Vertical bars show 95% confidence intervals based on standard errors of the bin means. Data is winsorized at 1%.

9 Conclusion

This paper studies wage setting in informal spot labor markets using data on firm–worker negotiations in India. Despite excess labor supply, undercutting is uncommon (27% of negotiations). Undercutting behavior varies sharply by contract type. Workers are about twice as likely to undercut for *Fixed Work* contracts (∼40%) as for *Fixed Hour* contracts

(21%), and this gap is robust to controls for contract value, negotiation timing, and fixed effects for day and enumerator. Survey data indicate that workers competing for both contract types come from the same population, suggesting that sorting by preferences is unlikely to account for the gap.

A model in which reservation wages depend on the effort–leisure trade-off within a workday rationalizes this pattern. Under *Fixed Hour* contracts, hours are fixed, ability differences are irrelevant to reservation wages, and the distribution is compressed. Under *Fixed Work* contracts, completion time is endogenous, higher-ability workers retain more leisure, and the resulting dispersion in reservation wages increases the scope for undercutting. Consistent with these predictions, we show in the data that the standard deviation in workers' reservation wage beliefs is significantly higher for *Fixed Work* than for *Fixed Hour* jobs. Moreover, this greater heterogeneity in reservation wages is positively and statistically significantly associated with the likelihood of undercutting for those jobs: when beliefs are more dispersed, the probability that at least one worker will be willing to accept a lower wage increases, making undercutting more prevalent.

These findings have several implications. First, the low overall rate of undercutting, even among workers who have incurred costs to travel to the market, reinforces evidence from Breza et al. (2025) that informal wage floors are sustained by non-market forces. But our results show that the strength of these floors depends on contract structure: wage norms are harder to sustain when workers hold heterogeneous reservation wages, as they do under *Fixed Work* contracts. This suggests that the scope for social sanctions to maintain wage floors is not uniform across job types, even within the same market and the same population of workers.

Second, the mechanism we identify—that contract design shapes the distribution of reservation wages and thereby the degree of wage competition—has broader relevance beyond the spot markets we study. Wherever employment involves a choice between time-based and output-based compensation for physical labor, the same effort–leisure channel should generate differential patterns of wage competition. The specific magnitudes we document are likely shaped by features of Patna's labor stands, including market thickness, worker turnover, and the strength of social ties. Whether the mechanism operates with similar force in rural agricultural markets, where social cohesion is stronger and wage norms appear more rigid, is an open question.

Third, our results speak to the design of labor market interventions. Minimum wage policies or collective bargaining arrangements may be more effective—or more necessary—for jobs offered under *Fixed Work* contracts, where the natural dispersion in reservation wages creates greater scope for employers to benefit from worker competition. Con-

versely, *Fixed Hour* contracts appear to generate compressed reservation wages even without formal coordination, suggesting that the wage floor in these markets is partly sustained by the structure of the contract itself.

Future work could examine whether firms strategically choose contract types to exploit differences in wage competition, or whether the observed patterns primarily reflect technological constraints on monitoring and task definition.

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Part I

Appendix

A Proofs

Proposition. *1 In Fixed Work jobs, higher-type workers have (weakly) lower reservation wages.*

Proof. Fix a worker i and a Fixed Work job ($j = 1$). Let the worker's reservation wage be

$$w_1^i \;=\; C^i + c\Big(e_1^i\Big) \;-\; g\Big(L(\theta_i, e_1^i)\Big),$$

where e_1^i solves the interior first-order condition

$$c'\Big(e_1^i\Big) \;=\; g'(L)\,\frac{\partial L}{\partial e}(\theta_i, e_1^i), \tag{A.1}$$

and $c'(\cdot)$ is increasing (convex costs), $g'(\cdot) > 0$ (leisure is valuable).

We study how w_1^i varies with type θ_i. Differentiate w_1^i with respect to θ_i, allowing the optimal effort e_1^i to adjust:

$$\frac{dw_1^i}{d\theta_i} = c'\Big(e_1^i\Big)\,\frac{de_1^i}{d\theta_i} - \Big[\,g'(L)\,\frac{\partial L}{\partial \theta} + g'(L)\,\frac{\partial L}{\partial e}\,\frac{de_1^i}{d\theta_i}\Big].$$

Use the FOC (A.1) to substitute $c'(e_1^i) = g'(L)\,\frac{\partial L}{\partial e}$; the two terms multiplying $\frac{de_1^i}{d\theta_i}$ cancel:

$$\frac{dw_1^i}{d\theta_i} = -\,g'(L)\,\frac{\partial L}{\partial \theta}(\theta_i, e_1^i).$$

By Assumption 2, higher type increases the effective productivity/leisure at a given effort, i.e. $\frac{\partial L}{\partial \theta}(\theta, e) > 0$. Since $g'(L) > 0$, it follows that

$$\frac{dw_1^i}{d\theta_i} \;<\; 0.$$

Therefore the reservation wage is (strictly) decreasing in θ_i whenever $\frac{\partial L}{\partial \theta} > 0$; if the inequality is weak, the result is weakly decreasing. □

Proof of Theorem 1

Proof. By Propositions 1 and 2, the Fixed Hour distribution depends only on C^i, while the

Fixed Work distribution depends on both C^i and θ_i. Since $C^i \perp \theta_i$, we have

$$Var(C^i + f(\theta_i)) = Var(C^i) + Var(f(\theta_i)) > Var(C^i),$$

establishing the variance result.

For entropy, recall that the Rényi entropy of order 2 is given by $E_2(F) = -\ln\left(\sum_w p(w)^2\right)$, where $\sum_x p(w)^2$ is the collision probability. Adding the independent component $f(\theta_i)$ spreads probability mass over a larger effective support of wage. This reduces the collision probability relative to a distribution that depends only on C^i, and therefore increases E_2. Hence

$$E_2(F_1) > E_2(F_0).$$

□

Proof of Proposition 2

Proof. Let $\delta = \eta - (\tau + \kappa) < 0$. For the latent cdf $F_j^*(x) = \Phi((x - \mu_j)/\sigma_j)$ and a draw $R_j^* = \mu_j + \sigma_j Z$,

$$F_j^*(R_j^* + \delta) = \Phi\Big(Z + \tfrac{\delta}{\sigma_j}\Big).$$

As σ_j increases, δ/σ_j becomes less negative, so $Z + \delta/\sigma_j$ stochastically dominates $Z + \delta/\sigma_j'$ for $\sigma_j > \sigma_j'$. Because $u \mapsto 1 - (1-u)^{m-1}$ and Φ are increasing, the expectation is strictly increasing in σ_j. Rounding to the grid shifts thresholds by at most τ, which preserves monotonicity. Therefore U_j is strictly increasing in σ_j. □

Proof of Proposition 3

Proof. Let $S_j = \mathrm{P}(X_j' < X_j \mid X_j)$ for an independent wage $X_j' \sim p_j$. The probability of no undercut given X_j is $(1 - S_j)^{m-1}$, so

$$U_j \;=\; 1 - \mathbb{E}\Big[(1 - S_j)^{m-1}\Big].$$

For $m \geq 2$, the function $\varphi(s) = (1-s)^{m-1}$ is convex on $[0, 1]$, hence by Jensen,

$$\mathbb{E}\Big[(1 - S_j)^{m-1}\Big] \;\geq\; \Big(1 - \mathbb{E}[S_j]\Big)^{m-1}.$$

Thus

$$U_j \;\leq\; 1 - \Big(1 - \mathbb{E}[S_j]\Big)^{m-1}.$$

By exchangeability of (X_j, X_j'),

$$\mathbb{E}[S_j] = \mathrm{P}(X_j' < X_j) = \frac{1 - \mathrm{P}(X_j' = X_j)}{2} = \frac{1 - C_j}{2}.$$

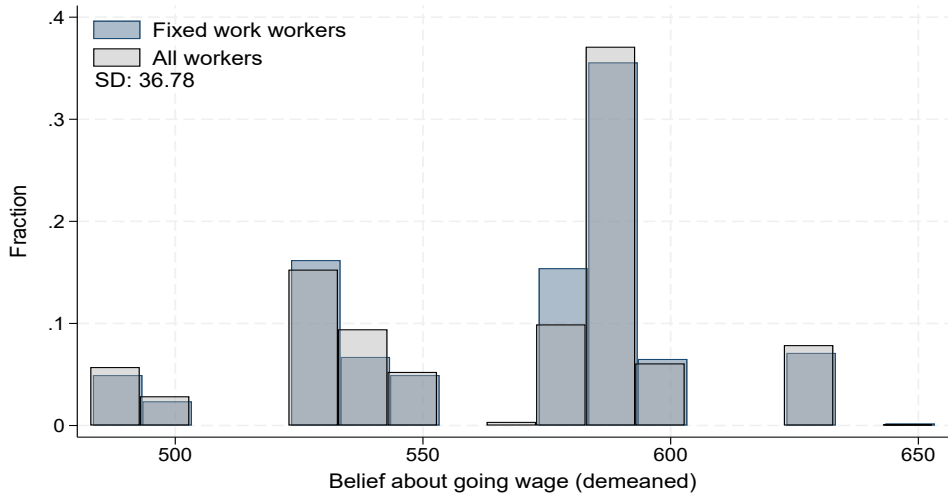
Substituting yields the bound

$$U_j \;\leq\; 1 - \Big(\frac{1 + C_j}{2}\Big)^{m-1}.$$

Since $x \;\mapsto\; 1 - x^{\,m-1}$ is strictly decreasing on $(0, 1]$ and $(1 + C_j)/2$ increases in C_j, the right-hand side is strictly decreasing in C_j. □

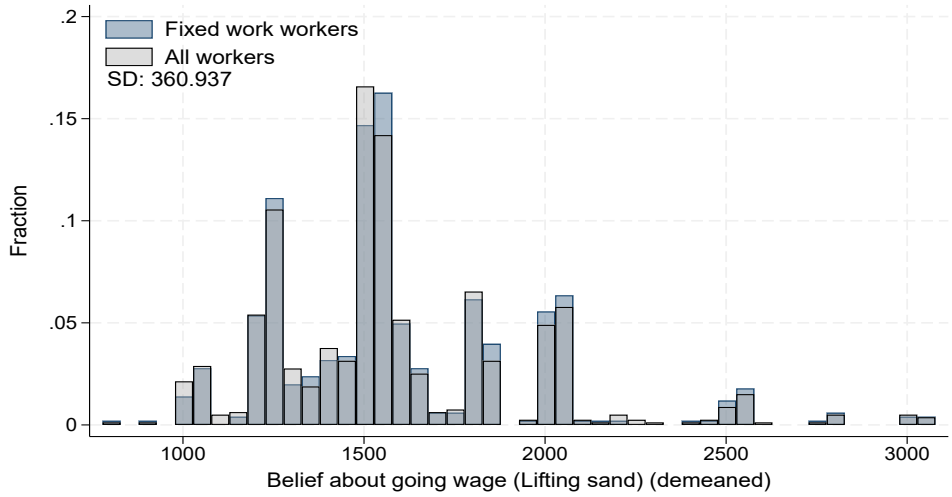
B Additional Figures

Figure B-1: Distribution of beliefs about wage floor of *Fixed Hour* work (Demeaned)

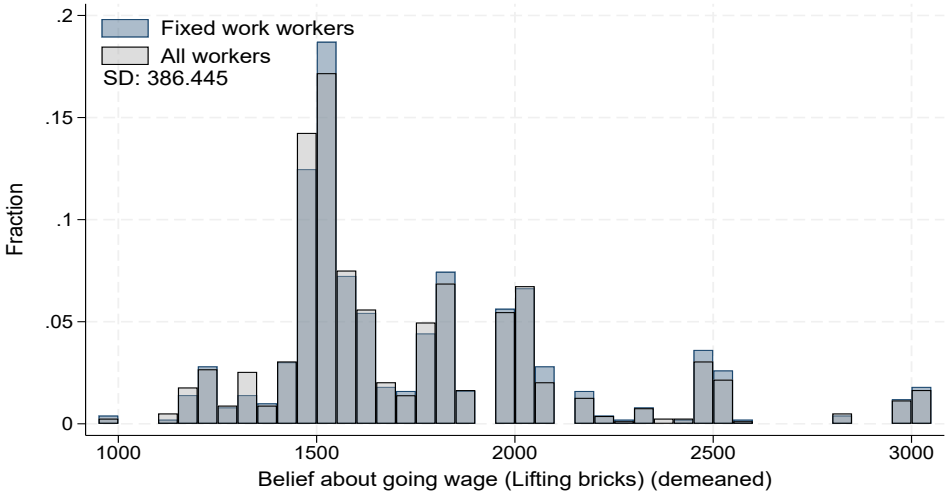


Notes: The figure shows data from a survey of workers conducted between May-August 2024. The figure captures response to the question: *What is the prevailing wage in the market for daily wage work?*. Each bar captures response within a width of 10 INR. Values are demeaned for market FE. Data is winsorized at 1%.

Figure B-2: Distribution of beliefs about wage floor for *Fixed Work* jobs (Demeaned)



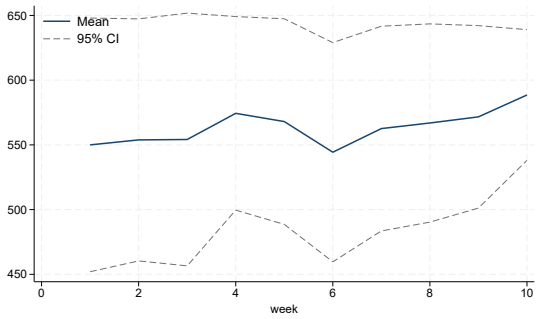
(a) Lifting sand



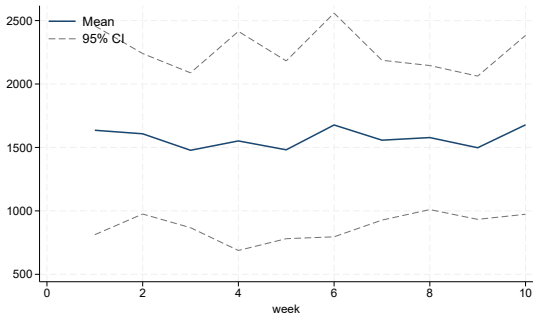
(b) Lifting bricks

Note: The figure shows data from a survey of workers conducted between May-August 2024. Panel A captures the response to the question: *What is the prevailing wage for lifting one trailer of sand till 2 floors?*. Panel B captures the response to the question: *What is the prevailing wage for lifting one trailer of bricks till 2 floors?*. Each bar captures response within a width of 50 INR. Values are demeaned for market FE. Data is winsorized at 1%.

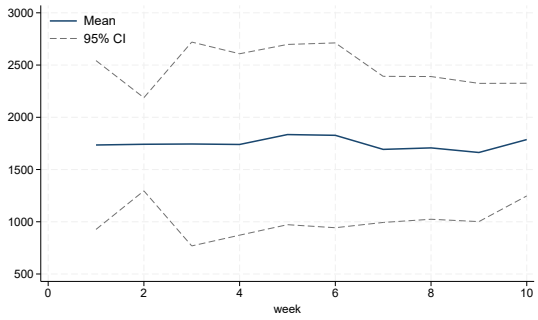
Figure B-3: Average beliefs over time



(a) Fixed hour



(b) Fixed work - Lifting sand



(c) Fixed work- Lifting bricks

Note: The figure shows data from a survey of workers conducted between May-August 2024. Figure shows the weekly means and 95% confidence interval of beliefs around different kinds of jobs. Data is winsorized at 1%.

C Robustness checks

Table C-1: Controlling for Value of the contract

	Undercutting			
	All		Successful	
Fixed work contract	0.2541***	0.1722***	0.2478***	0.1427**
	(0.0384)	(0.0504)	(0.0413)	(0.0568)
Value of contract	-0.0000	0.0000	0.0000	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
Observations	707	705	595	590
Mean for fixed hour	0.21	0.21	0.24	0.24
Day Fixed Effect	No	Yes	No	Yes

The dependent variable *undercutting* is a binary variable which captures whether any worker tried to undercut another worker on price. *Successful* includes those observations in which the firm and worker were able to complete the negotiation. We control for the value of the contract in all specifications. Standard errors, clustered by date, are in parenthesis. We use fixed effects for labor stand and success of the negotiation for all specifications. In column 5, we control for the first offer of the worker. * p < 0.10, ** p <0.05, *** p<0.01.

Table C-2: Robustness to Enumerator fixed effects

	Undercutting			
	All Enumerators		Excluding Outlier Enumerator	
Fixed work contract	0.176***	0.178***	0.179***	0.181***
	(0.026)	(0.026)	(0.027)	(0.026)
Observations	1,396	1,395	1,344	1,343
Mean for Fixed hour	0.21	0.21	0.20	0.20
Day Fixed Effect	No	Yes	No	Yes
Enumerator FE	Yes	Yes	Yes	Yes

The dependent variable *undercutting* is a binary variable which captures whether any worker tried to undercut another worker on price. Standard errors, clustered by date, are in parenthesis. We use fixed effects for labor stand, enumerator and success of the negotiation for all specifications. In column 3 and 4 we exclude the observations for the enumerator who was an outlier in undercutting. * p < 0.10, ** p <0.05, *** p<0.01.

Table C-3: Robustness to number of workers negotiating

	Control for no. worker negotiating				Sample: More than 1 worker			
	All		Successful		All		Successful	
Fixed work contract	0.107***	0.099***	0.100***	0.089***	0.185***	0.177***	0.173***	0.162***
	(0.026)	(0.026)	(0.029)	(0.029)	(0.030)	(0.030)	(0.036)	(0.036)
Observations	1,395	1,394	1,169	1,167	1,020	1,018	874	872
Mean for Fixed hour	0.21	0.21	0.24	0.24	0.31	0.31	0.34	0.34
Day Fixed Effect	No	Yes	No	Yes	No	Yes	No	Yes
Control for # workers	Yes	Yes	Yes	Yes	No	No	No	No

The dependent variable *undercutting* is a binary variable which captures whether any worker tried to undercut another worker on price. *Successful* includes those observations in which the firm and worker were able to complete the negotiation. Column 1-4 controls for number of workers negotiating with the firm. Column 5-8 shows results for the sample in which at least two workers were negotiating. Standard errors, clustered by date, are in parenthesis. We use fixed effects for labor stand and success of the negotiation for all specifications. * p < 0.10, ** p <0.05, *** p<0.01.

Table C-4: Controlling for Time of negotiation

	Undercutting			
	All		Successful	
Fixed work contract	0.2072***	0.2016***	0.1950***	0.1887***
	(0.0391)	(0.0381)	(0.0445)	(0.0425)
Half hour of negotiation	0.0152	0.0145	0.0016	0.0015
	(0.0134)	(0.0137)	(0.0144)	(0.0149)
Observations	609	609	539	539
Mean for fixed hour	0.28	0.28	0.30	0.30
Day Fixed Effect	No	Yes	No	Yes

The dependent variable *undercutting* is a binary variable which captures whether any worker tried to undercut another worker on price. *Successful* includes those observations in which the firm and worker were able to complete the negotiation. We control for the half hour of negotiation time in all specifications. Standard errors, clustered by date, are in parenthesis. We use fixed effects for labor stand and success of the negotiation for all specifications. The number of observations is smaller than our primary results as we observe time of negotiation for only a sub sample of negotiations. * p < 0.10, ** p <0.05, *** p<0.01.

Table C-5: Undercutting - interference in *Fixed Work* contracts

	Undercutting - interference			
	All		Successful	
Fixed work contract	0.166***	0.159***	0.163***	0.168***
	(0.033)	(0.034)	(0.034)	(0.036)
Observations	1,401	1,400	1,172	1,170
Mean for Fixed hour	0.46	0.46	0.47	0.47
Day Fixed Effect	No	Yes	No	Yes

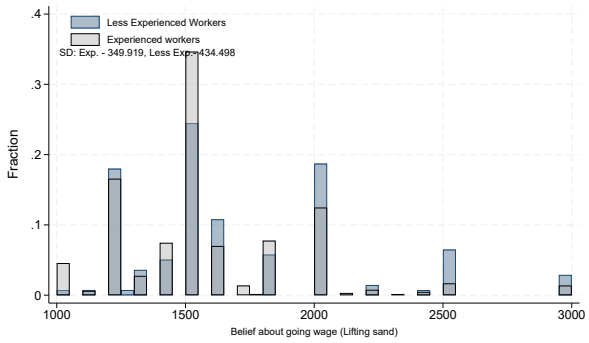
The dependent variable *undercutting - interference* is a binary variable which captures whether any worker tried to undercut another worker by interfering in the negotiation. *Successful* includes those observations in which the firm and worker were able to complete the negotiation. Standard errors, clustered by date, are in parenthesis. We use fixed effects for labor stand and success of the negotiation for all specifications. In column 5, we control for the first offer of the worker. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C-6: Undercutting and Entropy of wage distribution

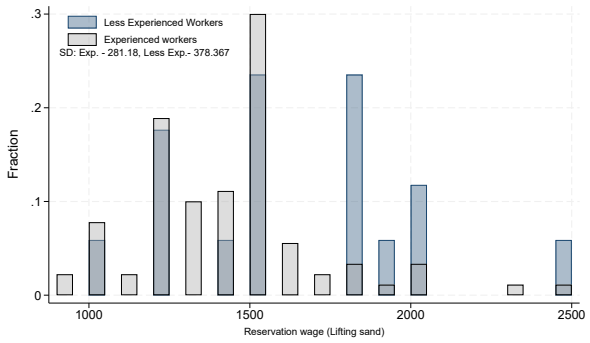
	Undercutting			
	All Sample		Appropriate Floor Sample	
Entropy	0.200***	0.198***	0.140***	0.141***
	(0.042)	(0.044)	(0.045)	(0.053)
Observations	694	691	521	512
Day Fixed Effect	No	Yes	No	Yes

The dependent variable *undercutting* is a binary variable which captures whether any worker tried to undercut another worker on price. The independent variable is the entropy for the going wage of the job calculated from the beliefs data. Column 1 and 2 have three types of jobs - plastering, all jobs involving lifting sand, all jobs involving lifting bricks. Column 3,4 include 5 type of jobs – plastering, lifting sand till floor 2, lifting sand till floor 4, lifting brick till floor 2, lifting bricks till floor 4. Standard errors, clustered by date, are in parenthesis. We use fixed effects for labor stand and success of the negotiation for all specifications. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

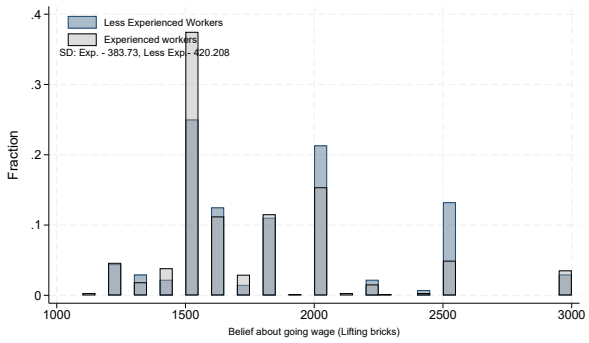
Figure C-1: Distribution of beliefs about wage *by Experience* for *Fixed Work* contracts



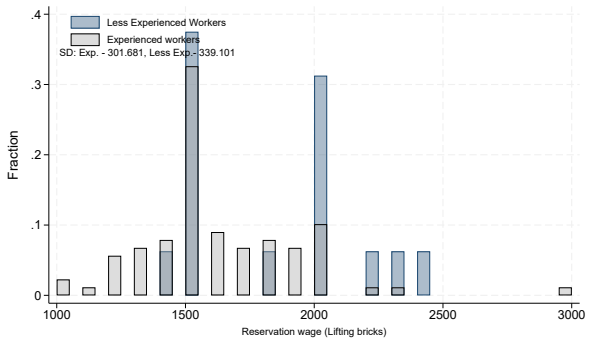
(a) Lifting sand - going wage



(b) Lifting sand - reservation wage



(c) Lifting bricks - going wage



(d) Lifting bricks - reservation wage

Note: The figure shows data from a survey of workers conducted between May-August 2024. Panel A, B captures the response to the question: *What is the prevailing wage/reservation wage for lifting one trailer of sand till 2 floors?*. Panel C, D captures the response to the question: *What is the prevailing wage/reservation wage for lifting one trailer of bricks till 2 floors?*. Less experienced workers are defined as workers below the age of 25 and Experienced workers are those who are 25 or older. Each bar captures response within a width of 50 INR. Data is winsorized at 1%.

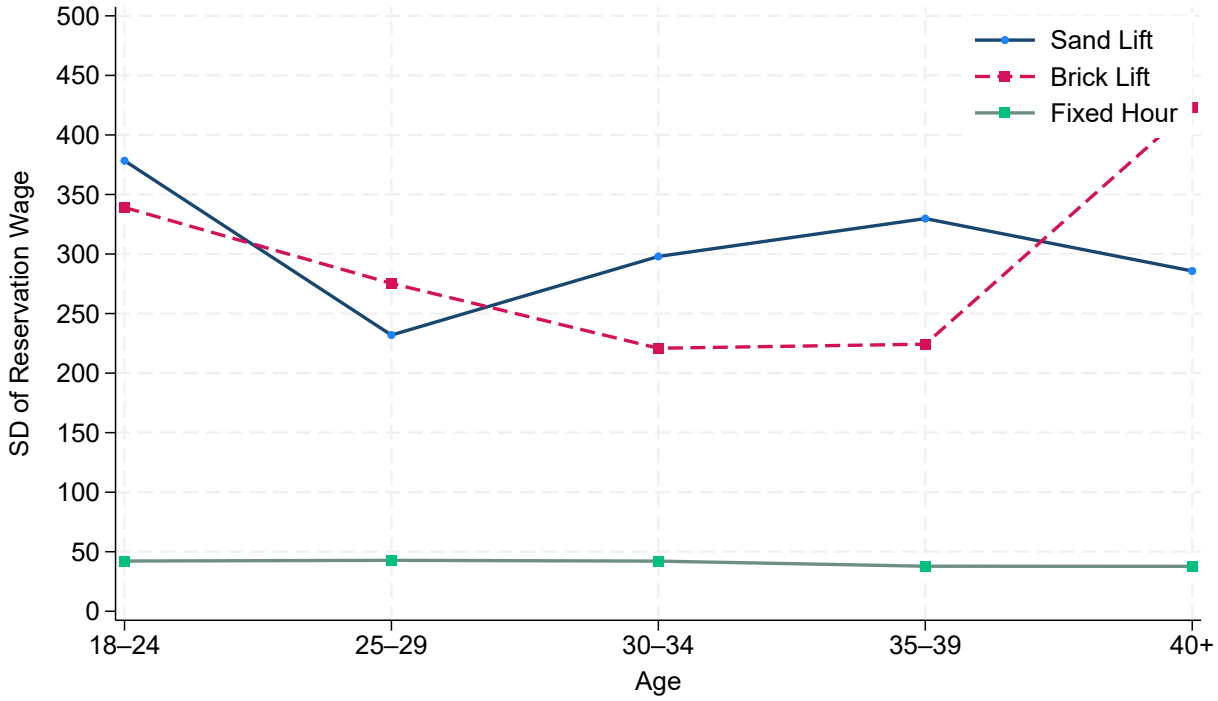
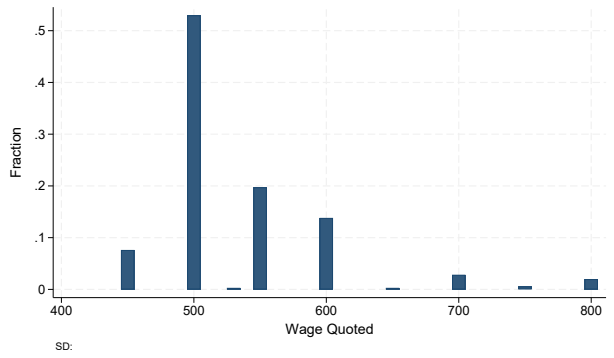


Figure C-2: Standard Deviation of Reservation wage with Experience/Age

Note: The figure shows data from a survey of workers conducted between May-August 2024. Figure shows the standard deviation of reservation wage for two types of fixed work jobs by the age of the respondent. Data is winsorized at 1%.

Figure C-3: Distribution of Wage Quoted for different contracts



(a) Fixed Hour - Wages Quoted in Negotiations



(b) Lifting sand - Wages Quoted in Negotiations



(c) Lifting bricks - Wages Quoted in Negotiations

Note: The figure shows data from negotiations between firms and workers. We use the least wage quoted by any worker during negotiation as *Wage Quoted*. For Figure B, C each bar captures response within a width of 50 INR and for Figure A each bar captures response within a width of 10 INR. In Figure B, C we restrict data to negotiations which involved lifting material till 2 floors of a building and rescale wages to ensure that all negotiations involve the same amount of material being lifted till 2 floors. Data is winsorized at 1%.

D Data Collection

D.1 Negotiation Examples

Details of negotiation recorded by the enumerator looks like the following:

Example 1 *Party: 1 labour is required for plastering. Worker 1-Worker6: Where is the work and what is the work? We will go. Party: It is nearby. W1: How much money will you give? P: I will give 500. W2: I will not go for 500. W3: If you give me 600 then I will go. W4: I will go for 550. P: No, I will not give more than 500. L4: Ok, I will go for 500. 1 worker went to work.*

In this example both *Undercutting* on price and *Undercutting - interference* take the value of 1. Total workers negotiating are 4. The contract type is *Fixed Hour*, and the work is of plastering. The value of contract is 500 per worker.

Example 2 *Contractor: There are 2 trailers of sand. Have to take it to the fourth floor W1: Where is the location C: Zero mile [a location in Patna]. W1: Will take 4000. C: I will pay 3000. W1: That won't work. W2: Give 3800. C: No. W3 to W4: We can ask for 3500. W3: Will work for 3500. C: Will give 3200. W4: Give 3200 + the cost of travel. C: Okay. W3, W4 agree to go.*

In this example both *Undercutting* on price and *Undercutting - interference* take the value of 1. Total workers negotiating are 4. The contract type is fixed work, and the work is of lifting sand till 4 floors. Total workers hired are 2 and the value of contract is 1600 per worker.