Negotiations and undercutting in low wage labor markets *

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Abstract

Millions of workers in low- and middle-income countries seek low-skilled jobs through informal spot markets in urban areas. This paper investigates firm-worker negotiations and wage-setting in these markets, using detailed micro-data from spot markets in India. Despite high unemployment rates, workers undercut each other in 26% of wage negotiations. Notably, the likelihood of undercutting depends on the contract type under which a worker is hired, which is strongly correlated with the job type. Jobs are broadly categorized into two groups: single-task and multi-task jobs. Consistent with predictions from a multitasking model, firms predominantly use fixed-hour contracts for multi-task jobs and fixed work contracts for single-task jobs, where workers are paid per task completed regardless of hours worked. Workers are nearly twice as likely to undercut during negotiations for fixed work contracts compared to fixed hour contracts. We explain this result using a model in which workers' reservation wages depend on their consumption and leisure needs. In this framework, effort choices—shaped by workers' abilities—determine the amount of leisure they can secure. This variation in leisure hours affects contracts without fixed hours, leading to a wider dispersion in reservation wage distributions for fixed work contracts compared to fixed hour contracts. A key prediction of the model is that undercutting increases with the dispersion of reservation wages, measured by the coefficient of variation. Empirical tests using workers' reservation wage data confirm this prediction, showing a higher likelihood of undercutting in jobs with more dispersed reservation wage distributions. These findings shed light

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on the wage-setting mechanisms in low-wage labor markets and demonstrate how job characteristics and workers' belief structures shape negotiation outcomes.

1 Introduction

Millions of workers in low and middle-income countries seek work at informal spot markets or labor stands. Informal firms looking for workers negotiate with them at these markets.[1] Workers often travel from distant places to these spot markets, whose locations are well-known to both firms and workers. The jobs firms offer require few skills, so any unemployed worker can try to find work in these markets. As a result, there is an excess supply of labor, and many workers return home empty-handed.[2] The nature of the work, being low-skilled and requiring little training, suggests that workers are highly substitutable. In summary, these markets consist of low-skilled and substitutable workers, who come from one of the poorest income groups in the country, and have low job finding rates. These conditions suggest that when firms hire workers at these stands, workers would compete with each other to bid down the wages allowing the firm to hire the workers at the competitive wage.

This paper studies this question by examining the negotiation process between firms and workers in low wage spot markets. Specifically, we try to answer three questions: i) Do workers undercut each other in the negotiation process? ii) How does undercutting vary across jobs and contracts of different types? iii) Given i), ii), what can we say about the wage-setting process in low-wage markets? A long literature in economics going back to Dasgupta and Ray (1986), Osmani (1990) has studied the question of wage setting in low wage labor markets. To answer these questions we collect data in real-time on wage negotiations between firms and workers for jobs offered at 22 spot markets in Patna, India over a period of eight months.

Our first finding is that undercutting on wages is uncommon — workers bid down another worker's offer in only 26.4% of the negotiations (N=1563). This suggests that the markets are not as competitive as the prevailing market conditions might imply. This observation from a real-time spot market supports the presence of wage floors in rural labor markets (Breza et al. (2019)). Importantly, the extent of undercutting varies with the nature of the contract and the type of job the firm seeks to fill. Jobs in these markets can be classified into two categories based on the number of tasks to be completed within the job: i) Multiple Task Jobs, where the number of tasks within a job can vary, as the name suggests; and ii) Single

[1] In most cases these are one person firms, which have taken the contract to complete a job, such as building a house, in construction.

[2] We show this in Varun (2024).

Task Jobs, where the task is well-defined, but the number of hours required to complete it may vary depending on the worker's skill and effort. We analyze the heterogeneity in undercutting across these two types of jobs and the contracts on which they are offered.

First, we show that in the data we collect firms almost exclusively hire workers for *Multiple task* jobs on a *fixed hour* contract where workers are paid for a fixed number of hours worked (usually 8) at the end of the work day. For *Single task* jobs firms predominantly hire workers on a *fixed work* contract, where the worker gets paid after the task is completed, no matter the number of hours required to complete it.[3] This equilibrium behavior of firms aligns with the predictions of the multitasking model of incentive contracts (Holmstrom and Milgrom (1991)). According to this model, when firms observe the quality of different tasks within a job with noise, it becomes optimal not to incentivize individual tasks. Instead, firms opt to offer a fixed wage for a certain number of hours.

Then we examine how undercutting varies across these two types of contracts. Our main result is that workers are twice as likely to undercut on wage when hired on a *fixed work* contract ($\sim 40\%$) compared to a *fixed hour* contract (21%). Note that, while there may be variation in preferences for the two types of contracts on the worker side, the set of workers competing for both jobs in the market is essentially the same.

These results hold, and the coefficient remains quantitatively similar, when we include fixed effects for the day of the negotiation. Standard economic models would suggest that undercutting should be higher for jobs with greater value. To account for this, we control for the per-person value of the contract and find that the coefficient remains quantitatively unchanged.

The difference in extent of undercutting across different jobs is not driven by the number of workers who have stronger preferences for the *fixed work* job. In a survey with 843 workers, 39% generally take up *Multiple task* jobs where as 35% generally take up *Single task* jobs, and the remaining 26% do both types of jobs. Standard theory would suggest that undercutting is going to be higher when the number of workers vying for a job is higher. Our results suggest that this is not the case. An opposing view could be that norms around fair wage can be enforced with ease if the number of individuals who adhere to the norm are higher. One can consider the workers who prefer to work on *single task* jobs and *multiple task* jobs as separate groups with their goal being to enforce the norm on wage. Even then, the difference in extent of undercutting cannot be explained by this theory as the size of both these groups (35% and 39% respectively) is large.

Our results speak to the recent research on labor markets for agriculture by Breza et al. (2019), which has shown that workers in these markets maintain a wage floor through a

[3]Fixed work contracts can be thought of as a piece-rate contract with just one piece to be completed.

threat of social sanctions. This threat is relevant, but not to the same degree, in our setting as workers are less likely to know each other. While threat of social sanctions could be a possible explanation for low levels of undercutting, they don't explain the differential rates of undercutting across contract types.

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 costs of undercutting). The reservation wage of an individual worker (who varies in ability) for a contract depends on their daily consumption (which differs across workers), a mark-up on consumption, 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 have no incentive to exert effort beyond a baseline level in these contracts, which 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 worker consumption.

In contrast, in fixed work contracts, the number of hours is not fixed. Workers can trade higher effort (which is costly) for a greater number of leisure hours. Workers with higher ability achieve a higher return in leisure hours for the same level of effort. This heterogeneity in ability means that workers exert different levels of effort. As a result, the combined cost of effort and the value of leisure hours varies at the individual level, forming its own distribution. Since the same pool of workers is searching for both fixed work and fixed hour contracts, the distribution of consumption remains consistent. However, the reservation wage distribution for fixed work contracts is more dispersed than that for fixed hour contracts. The model predicts that undercutting in any job or contract increases with the dispersion in the reservation wage distribution.

We test this hypothesis using data on beliefs about going wage and reservation wage for different jobs (single and multiple task) collected at these spot markets. To make sure that undercutting is not being driven by a higher mean value of reservation wage, we choose coefficient of variation as the relevant statistical measure of dispersion. The coefficient of variation of the distribution of workers' belief of reservation wage for *fixed hour* jobs is much lower than this statistic for the *fixed work* jobs. Thus the beliefs of workers on the going wage for a *fixed work* job is more dispersed than their beliefs for the *fixed hour* job. A formal statistical analysis finds that there is a positive and statistically significant relation between coefficient of variation of the reservation wage distribution and the extent of undercutting in a job. Therefore, even in the presence of costs of undercutting (of which social sanctions

may be one), workers would feel that it is fair game to undercut if the wage being negotiated is higher than what they think is the reservation wage.

The differential rate in undercutting which is driven by dispersion in beliefs gives us insights about the wage setting process in informal markets. In *Fixed hour* contracts, workers are hired for 8 hours (and therefore effectively the entire day). They get to take breaks between work and can set their own pace. Thus, the firm has bought their time and not their effort. In *fixed work* contracts, firm buys a fixed task from the worker, and the time can vary. As leisure is valuable, the ability of individual worker becomes important in these jobs. High ability workers can trade time (leisure) for money and therefore they can undercut workers with lower ability. The effect of ability is not present in bidding for fixed hour jobs as the number of hours is fixed.

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 (Varun (2024)). We make contributions on both the theory and empirics of wage setting in informal labor markets.

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. (2019) 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. My results show that this phenomenon is determined by the nature of the contract being offered. Productivity of workers matters in fixed work contracts, which leads to higher undercutting in these contracts.

Unlike Breza et al. (2019), 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 paper finds that only 1.8% workers accept a wage below the going wage in public for daily wage (fixed hour) jobs in agriculture. 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 worker's decision to choose effort. 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 explains higher undercutting in jobs which don't 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. (2019)—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. (2019)).

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.

Our last contribution is to the literature which tests predictions of models in contract theory. The effect of performance pay incentive contracts on worker productivity has been shown previously by Lazear (2000), Shearer (2004). Our contribution is to show that informal firms of low and middle income countries choose optimal incentive contracts based on the nature of the job in equilibrium. We use our micro data to show that firms hire workers on fixed hour contracts (for the day) for jobs which involve multiple tasks, and on piece rate (fixed work) contracts for jobs which involve completing one task. This choice is optimal

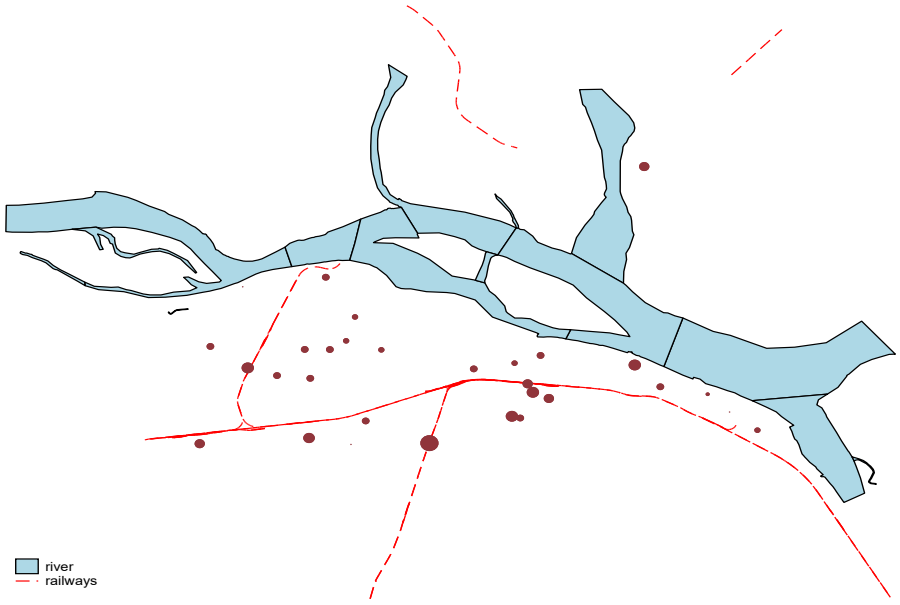
under the multitasking model of Holmstrom and Milgrom (1991).

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

Figure 1: Spot markets in Patna



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

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 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. 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 in the business of supplying labor for construction, 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 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. We refer to this job 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

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

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

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 Data

We collected micro data on negotiations between firms and workers at spot markets in the capital of the state of Bihar, Patna. There are around 40 spot markets or labor stands in the city. We collected data at 22 labor stands between January 2024 and September 2024.

3.1 Data Collection process

3.1.1 Negotiation Data

The micro 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 or private employers and workers. Representative of firms or private employers start arriving at the market around 7 am. The employers generally arrive on motor bikes, though some come on foot as well. As there are more workers than employers, they are surrounded by workers upon their arrival.

The enumerators were instructed to embed themselves within this group of workers. They were asked to note down all the details of conversations between the firm and the worker. This included the job that the employer was hiring for, as well as the type of contract on which they wanted to hire the worker. We use this information to classify the jobs as *Multiple Task* or *Single Task* and the kind of contract for each type of job. The information also 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. Additionally, 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 classified as successful if the employer and worker agreed to the terms. If the enumerator missed any information during the negotiations, they were instructed to ask a laborer who was part of the negotiation after it was over. Appendix subsection C.1 gives examples of negotiations as recorded by the enumerators.

3.1.2 Data on beliefs of workers about wages

In addition to collecting data on negotiations, we gathered information on workers' beliefs about the prevailing wage and reservation wage for various jobs. Workers were randomly selected by enumerators, who were instructed to accompany each respondent to a location 15–20 meters away from the stand to ensure privacy. This distancing aimed to minimize spillover effects and alleviate concerns about social sanctions (Breza et al. (2019)). Workers were then asked: *What is the going wage for X?*, where X represented specific tasks 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 of a job's reservation wage distribution and the extent of undercutting observed during wage negotiations for that job.

3.2 Data description:

For each negotiation, we observe the following variables:

- The type of job, the amount of material to be carried (if applicable) and to what distance.
- The contract on which the firm is hiring — *fixed hour* or *fixed work*.
- The starting offer of employers and all workers who were part of the negotiation.
- The last offer of firms 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 for the job.
- Time of negotiation.[6]

Using this data, we classify each job as *Single Task* or *Multiple Task*.
We define the two types of contracts on which firms hire workers below.

Definition 1. *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.*

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 2. *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 3. *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 4. *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

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

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 Results

We start with a descriptive summary of our negotiation data. Then we show the relationship between the different type of jobs for which the firms hire at the spot market and the contracts offered for these jobs. Having established a strong relationship between type of jobs and contracts offered in equilibrium, we will show how the extent of undercutting varies with type of contract. After that we will delve into the reasons behind this variation.

4.1 Descriptive summary

Table 1 shows the summary statistics of the negotiations we observe at the spot markets. 63% of the contracts in these negotiations are fixed hour, where workers have to work for 8 hours for a given wage. Workers undercut each other on wage in 26% negotiations. This is a small figure given that workers find work on only half the days they come to the spot market.[7] 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.[8] Despite this, workers don't undercut each other on wages more often than not. Workers interfere in ongoing negotiations in 52% cases. 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.

It is important to remember that other workers not interfering in ongoing negotiations, that is when *Undercutting - interference* is 0, doesn't imply that they are not interested in the job or that they are not listening to the job being offered. Whenever a firm comes to the market for hiring, they are surrounded by many workers, and even in negotiations where there is no undercutting, many workers surround the representative of the firm and listen to the job being offered.

A majority of negotiations are successful, and only 16% aren't. This in combination with low levels of undercutting suggests that firms and workers are both aware of the going wage

[7]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%.

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

for different jobs and first offers are acceptable in many cases.

What factors explain the low levels of undercutting? If workers and firms have a common understanding of the going wage for different jobs, then many first offers of firms and workers would lead to successful negotiations. But why don't firms wait for other workers to undercut or offer a wage below this commonly known going wage? One reason could be that firms want to be fair in their offers. It could also be the case that firms know that no worker would go below the going wage and therefore don't try at all. We explore this question in more detail in later subsections.

Table 1: Descriptive summary of negotiations

	Mean	SD	N
Negotiation Data			
Fixed Hour contracts	0.63	0.48	1,551
Undercutting on wage	0.26	0.44	1,563
Undercutting - interference	0.52	0.50	1,587
Successful Negotiations	0.84	0.37	1,588
Belief Data			
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 may vary due to missing data.

The second panel 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.

4.2 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, 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, more than a 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.

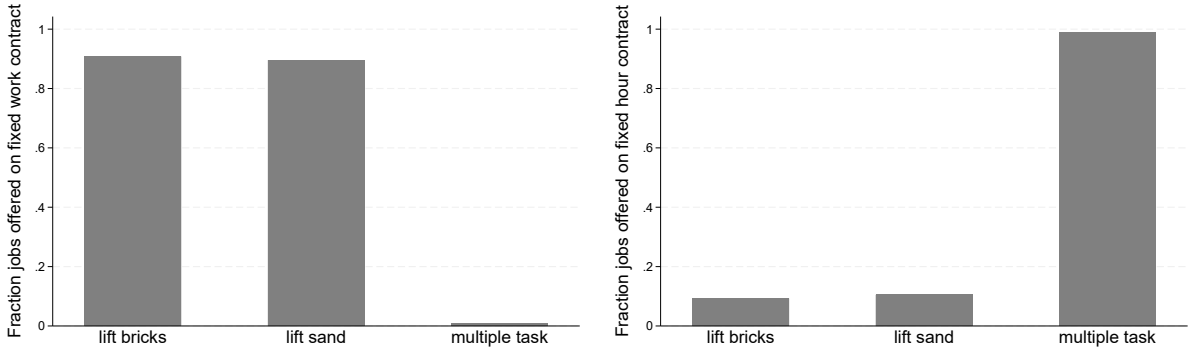
The negotiation process between firms and workers for these different jobs is the same. In both cases, the firms are surrounded by the workers when they arrive at the market to hire. Workers preference for the type of jobs and thereby the contracts may differ. In a separate survey, we ask workers whether 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 6, 5).

4.3 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 26% of negotiations which seems low for these markets.

In this subsection, we examine how undercutting varies across the two types of contracts

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.

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 hypothesis suggests that workers set their reservation wages based on the contract type rather than the 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 contract type.

We use the specification shown in Equation 4.1 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 spot market, and Y_{jt} captures whether there was undercutting on wage in negotiation j on day t.

$$Y_{jt} = \alpha + \beta D_{jt} + \mu_t + \gamma_s + \epsilon_{jt} \tag{4.1}$$

Table 2 shows the results for the regression in equation 4.1. Column 1, 2 show the coefficient β in equation 4.1 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 show 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.

Table 2: Undercutting in fixed work contracts

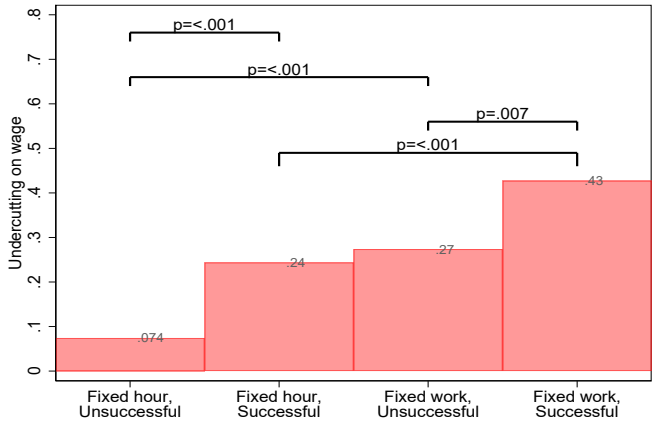
	Undercutting				Percent undercut
	All		Successful		
Fixed work contract	0.186***	0.180***	0.180***	0.179***	0.059***
	(0.027)	(0.027)	(0.031)	(0.031)	(0.019)
Observations	1,396	1,395	1,170	1,168	357
Mean for Fixed hour	0.21	0.21	0.24	0.24	0.15
Day Fixed Effect	No	Yes	No	Yes	No

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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

In column 3, 4 we restrict our sample to negotiations in which worker and firm successfully negotiated the contract. The extent of undercutting is higher for successfully negotiated fixed hour contracts. The coefficient of the regression is higher for successful negotiations as well. Figure 3 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 negoti-

Figure 3: 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.

ation 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 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.

4.3.1 Robustness checks

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

Robustness to contract value Even if undercutting comes at some cost, those costs might be smaller than the monetary value of the contract itself. Thus this rudimentary analysis would suggest that workers are more likely to undercut each other for contracts which have a higher value. If fixed work contracts have higher value than fixed hour contracts then this may confound our result. Therefore, in Appendix Table B-1 we control for the value of the contract in all negotiations. Value of contract is calculated by dividing the last wage offer of any worker during the negotiation by the number of workers being hired. In fixed hour contracts, negotiations mostly happen at the level of one worker, so we divide the last offer by 1. For fixed work contracts, we divide by the number of workers the firm was hiring for the job. We don't find a strong positive correlation between value of contract and

undercutting in our results. Our coefficient of undercutting has similar value to what we found in Table 2.

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.

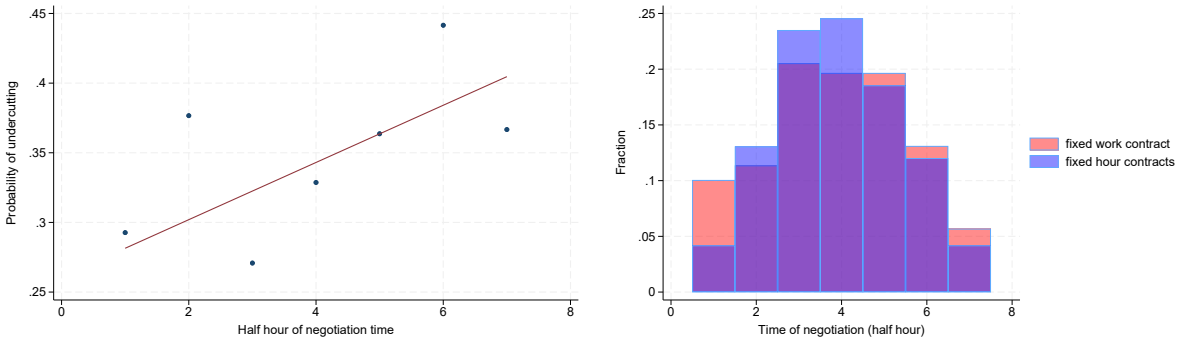
The results shown in Appendix Table B-2 highlight that undercutting is higher and statistically different for fixed work contracts when compared to fixed hour contracts even when we control for number of workers. However, the coefficient decreases significantly when we control for number of workers negotiating, 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 Another potential explanation for the observed undercutting behavior is that negotiations for the two types of contracts occur at different times of the day, which could influence workers' undercutting tendencies. For instance, workers might be more likely to undercut later in the day as they grow more desperate to secure work. Indeed, Figure 4a demonstrates that the unconditional likelihood of worker undercutting increases as the day progresses.

To ensure our results are not driven by systematic differences in the timing of negotiations

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.

for different contracts, we first plot the distribution of negotiation times for the two types of contracts in Figure 4b. This figure indicates that there are no substantial differences in negotiation timing between the two contract types. Additionally, in Appendix Table B-3, we control for the time of negotiation in our primary specification and find that the coefficients remain quantitatively similar, alleviating concerns about this potential confounder.

Undercutting across job types vs contract types Our analysis in Table 2 focuses on contract type as the primary source of variation in undercutting. However, one could argue that job type (single-task versus multi-task) might instead drive differences in undercutting. This consideration is particularly plausible given the strong correlation between job type and contract type: single-task jobs are predominantly offered on fixed work contracts, while multi-task jobs are largely associated with fixed hour contracts (as shown in Figure 2). To argue that it is contract type and not job type that drives undercutting, we utilize the variation generated in contract type for some single task jobs. As shown in Figure 2, approximately 10% of lifting sand, bricks jobs, which are single task, are offered on fixed hour contracts. Therefore, we compare undercutting within these jobs across contract types. The results shown in Table 3 indicate that undercutting is higher in fixed work contracts compared to fixed hour contracts for single task jobs. This provides evidence that the main margin across which undercutting varies is contract type.

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.

4.3.2 What drives the difference in undercutting across contract types?

There is a significant difference in the extent of undercutting by workers across different contracts and jobs. What are the reasons for this difference? Workers are likely to undercut another worker if their reservation wage is higher than the last offer quoted by another worker. Workers will keep undercutting each other until one of them reaches their reservation wage, and the other worker can bid a value ϵ below that reservation wage and win the contract. The extent of undercutting is also going to be affected by any non-monetary costs which arise from undercutting. Breza et al. (2019) show that workers in rural agricultural markets face social sanctions if they accept an offer below the going wage. These effects could be relevant in our setting as well. A crucial factor for sanctions of any form to be imposed upon violation of a norm is that there should be an agreement over what the norm is or when it is violated. In our setup, this translates into agreement over the going wage for a job. If workers lack consensus on the prevailing wage for a particular job, they are more likely to engage in heightened competition, often undercutting one another at a greater rate. This dynamic is especially pronounced in jobs where agreement on the standard wage is minimal.

We use this as a starting point to build a model to understand how workers decide their reservation wage for different types of jobs. The model argues that the reservation wages that workers set for a job depends on the kind of contract offered. Contracts which fix the number of hours incentivize workers of different types to exert similar effort, where as

contracts which do not fix the number of hours incentivize workers of different types to exert differential effort due to the value of leisure hours. This differential effort leads to variation in the reservation wage for workers of different types for contracts in which hours are not fixed, leading to higher undercutting in these contracts. We describe this model in detail in the next section.

4.4 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:

$$Y_{jt} = \alpha + \beta L_{jt} + \mu_t + \gamma_s + \epsilon_{jt} \tag{4.2}$$

D_{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 show that undercutting is higher during peak season (when it is assumed to begin in August) by around 40%. In column 2, we show 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. 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 peak 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 hypothesis 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.

5 Theoretical Framework

In this section we lay out a model which describes how workers in our setting set their reservation wage.

Preliminaries: Worker i have a type θ_i and they negotiate with firms for jobs with contracts $j \in \{\text{Fixed hour}, \text{Fixed work}\}$. We denote *Fixed hour* jobs by $j = 0$ and *Fixed work* jobs by $j = 1$. Effort required to complete a job is given by e_j and the number of leisure hours after the job is over is given by $L_j(\theta_i, e_j^i)$.

The reservation wage of a job for the worker is given by:

$$w_j^i = \nu * \underbrace{C^i}_{\text{Monetary Value of consumption}} + \underbrace{c(e_j^i)}_{\text{cost of effort } e \text{ in job } j} - \underbrace{g(L_j(\theta_i, e_j^i))}_{\text{value of leisure for } i} \tag{5.1}$$

where e_j^i is effort exerted in job j and L_j is leisure in job j. C^i is the value of daily consumption for the worker, and ν is the mark-up which is greater than 1 and captures the worker's earnings besides the money spent on consumption and effort.

Leisure hours $L_j(\theta_i, e_j^i)$ is the number of hours that a worker gets within the 8 hour work day.

$$L_j(\theta_i, e_j^i) = 8 - H_j(\theta_i, e_j^i) \tag{5.2}$$

Assumption 1. *The number of hours required to complete a job are fixed for a fixed hour job:* $H_j(\theta_i, e_j^i) = 0, \quad \forall i.$

Assumption 2. *The number of hours required to complete a job are decreasing in effort and type for a fixed work job: i)* $\dfrac{dH_1(\theta_i, e_j^i)}{\delta\theta} < 0; \quad ii) \quad \dfrac{dH_1(\theta_i, e_j^i)}{\delta e_j^i} < 0.$

Assumption 1 implies that leisure hours in such a job is 0. Assumption 2 implies that L_1 is increasing in θ_i and effort e_j^i.

Choosing effort Effort e_j^i captures the total number of hours for which the worker *actively* works during any job. This is different from H_j which is the number of hours required to complete the job j. e_j^i is less than or equal to H_j under all circumstances.

In a fixed hour job, workers get several breaks through the day, many of them during switching between tasks. For instance, a worker would get a break when they have finished with carrying sand, and have to start with the process of bringing water for mixing. In a fixed work contract, worker can take breaks as well but it comes at the cost of loosing hours of leisure.

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

Assumption 4. *Worker is compensated in fixed work job,* $j = 1$*, only if the task is completed.*

Assumption 5. *Worker is compensated in fixed hour job, $j = 0$, only if they put in effort $e_0^i \geq \underline{e_0}$.*

Assumption 6. *Let $c(e) = b * e^2$ and $g(L) = (\theta^\alpha * e)^\gamma$, where $0 < \alpha, \gamma < 1$.*

Assumption 7. *The monetary value of consumption C^i is orthogonal to θ_i.*

Assumption 7 implies that worker type is independent of the consumption levels of the worker.

Worker i chooses effort e_i^j in each job j by maximizing equation 5.1 while satisfying assumption 4 and 5. Thus it follows that workers put in equal efforts in a fixed hour job.

Lemma 1. *The effort exerted by workers is same in fixed hour contracts: $e_0^i = \underline{e_0}, \forall i$.*

Lemma 2. *The first order condition for worker effort in fixed work contracts is : $c'(e_1^i) = g'(L) * \frac{dL}{\delta e_1^i}, \forall i$.*

Lemma 3. *Under Assumption 6, it must be the case that e_1^i is a strictly monotonic function of θ, and $c(e_1^i) - g(L_1^i)$ is a function of θ_i.*

Note that Assumption 6 is a sufficient condition for Lemma 3 and not a necessary condition. Lemma 3 should hold under most reasonable functional forms of $c(e)$ and $g(L)$ which satisfy assumption 2 and 3.

Proposition 1. *The reservation wage distribution for fixed hour jobs is given by $\nu * C^i + c(e_0)$.*

This follows from Lemma 1.

Proposition 2. *The reservation wage distribution for fixed work jobs is given by $\nu * C^i + f(\theta_i)$.*

Proposition 2 follows from Lemma 3.

Theorem 1. *Variance of reservation wage distribution for fixed work jobs is greater than the variance of reservation job distribution for fixed hour jobs.*

Proof. Follows from proposition 1,2 and the fact that $Var(X+Y) > Var(X)$ for two random variables X, Y. □

How does the variance of the wage distribution affect the extent of undercutting? When a firm arrives at the stand, then the workers surround the firm. Let this number of workers be N. Undercutting carries some costs m. This could be due to fear of social sanctions or for other reasons. The cost m is the same across all jobs. Workers will undercut if the reservation wage of the workers is greater than m and if their reservation wage differ

from each other. The latter is captured by the standard deviation of the distribution. The former factor would mechanically increase in the mean of the reservation wage distribution. Therefore, to get at the undercutting which is driven by differences in beliefs we need to scale the probability of undercutting by inverse of mean of the wage distribution.

Prediction 1. *The probability that workers undercut each other for a job with reservation wage distribution given by W_j is directly proportional to σ_j/μ_j.*

We will test this prediction in the next section.

6 Testing the model predictions

6.1 Beliefs about wages

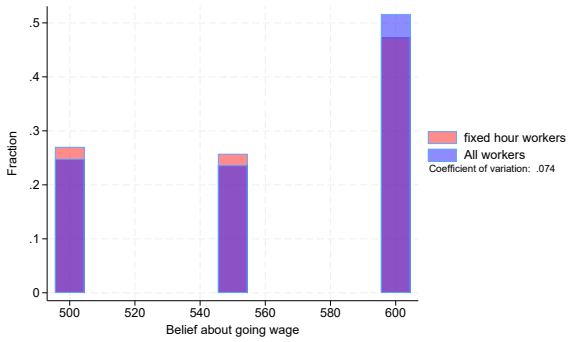
Figure 5 shows the distribution of beliefs of workers about the going and reservation wage for *fixed hour* contracts which hire workers for 8 hours every day. The first thing to note is that the distribution has mass on very few support points.[9] This suggests that workers have a fair amount of overlap in their beliefs. As Proposition 1 states, this variation comes from the differences in the monetary value of consumption for workers.

The standard deviation is much smaller than the mean as coefficient of variation is only 0.076. Secondly, 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. Panel c shows that the going wage distribution (first order) stochastically dominates the reservation wage distribution. Even though these are stated and not revealed preferences, they provides suggestive evidence that workers may be willing to accept offers below what they believe is the going wage.

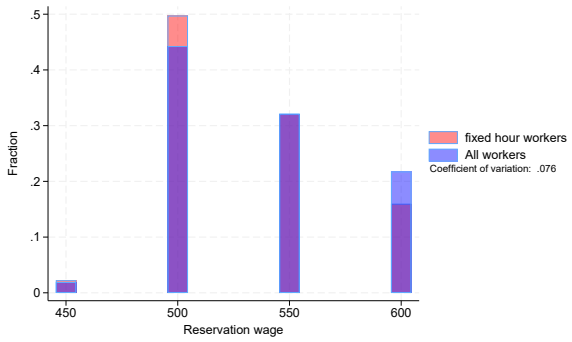
Figure 6 shows the beliefs of workers about going and reservation wage for fixed work contracts. We show the beliefs for two types of jobs — lifting bricks and lifting sand. As shown in proposition 2, the variance in the distribution is driven by differences in both the monetary value of consumption for workers as well as the differences in types which drives the difference in cost of effort and value of leisure. Comparing this to Figure 5, we can see that the distribution is much more dispersed, for both type of jobs and for both the going wage and reservation wage. The coefficient of variation is between 0.21 and 0.23 which is almost three times the coefficient of variation for fixed hour jobs. This serves as a test for theorem 1, and finds it to be true.

[9] The histograms have width of only 10 INR.

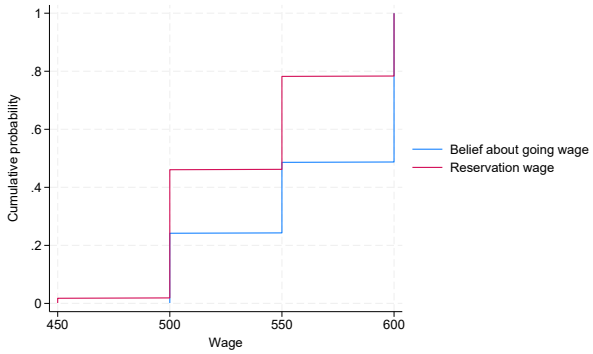
Figure 5: Distribution of beliefs about going wage of fixed hour work



(a) Going wage



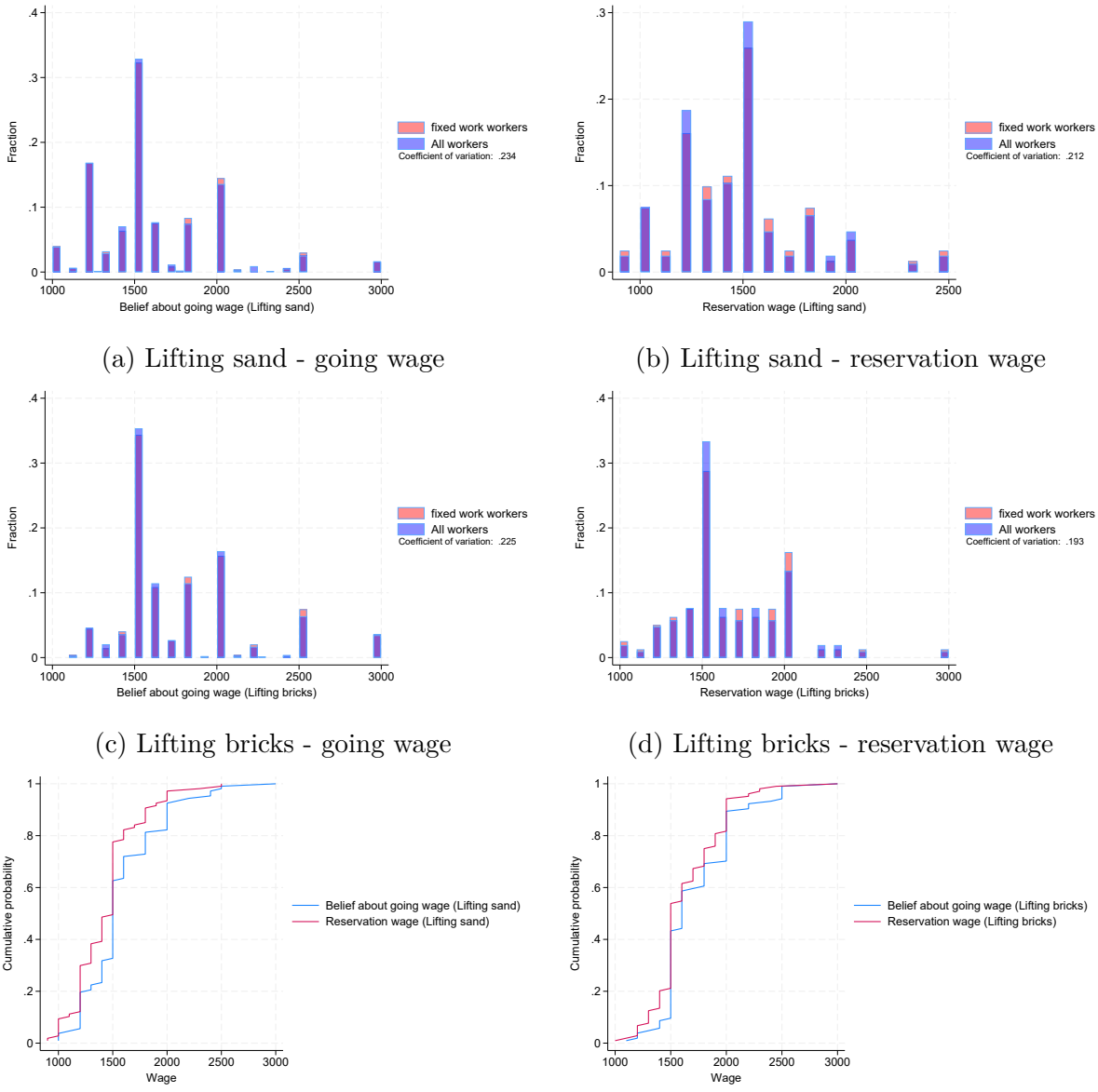
(b) Reservation wage



(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 6: 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%.

The beliefs about wages for these jobs are much higher than for the fixed hour jobs. This is because fixed work contracts involve multiple workers working together to complete the job. After accounting for the share of other workers, the going wages of these contracts per worker is similar on average to the fixed hour contracts.

Testing prediction 1 These figures illustrate that a higher dispersion in beliefs around going wage, which is indicative of higher disagreement around the correct going wage, may lead to higher undercutting. We test this statistically by running a regression of undercutting for jobs on the coefficient of variation of the beliefs about the job.

To conduct this analysis, we focus on a subset of jobs involving plastering (a multi-task job offered on a fixed-hour contract), lifting sand (a single-task job offered on a fixed-work contract), and lifting bricks (another single-task job offered on a fixed-work contract). First, we examine the correlation between undercutting behavior and the coefficient of variation (*cov*) of reservation wages for these jobs. For sand and brick lifting, we calculate the *cov* for jobs that require lifting materials up to 2 floors. The results, presented in Columns 1 and 2 of Table 5, show a strong positive relationship between undercutting and the coefficient of variation of the distribution of beliefs about going wages.

A more precise test involves restricting the negotiation data to the appropriate number of floors. For this analysis, we use five job types: plastering, lifting sand to floors 2 and 4, and lifting bricks to floors 2 and 4. The *cov* values for these jobs are derived from our beliefs data. The results, displayed in Columns 3 and 4 of Table 5, confirm that the strong correlation between undercutting and the coefficient of variation persists under this more refined analysis.

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 A-2, A-1. The distribution and coefficient of variation are similar to what we see in our main figures.

These results serve as a test of the model outlined in the previous section. They indicate that an important factor influencing the reservation wage of low-income workers is the number of leisure hours a job provides. When jobs allow workers to exert effort to increase their leisure hours, the workers' abilities become more salient, leading to greater dispersion in the reservation wage distribution. A higher dispersion in the reservation wage distribution results in increased undercutting.

In contrast, fixed-wage jobs, which require workers to adhere to a fixed number of hours,

do not incentivize additional effort. This lack of incentive causes workers to exert similar levels of effort, leading to a reservation wage distribution that is relatively less dispersed.

Table 5: Undercutting and coefficient of variation of wage beliefs

	Undercutting			
	All Sample		Appropriate Floor Sample	
Coefficient of variation	1.256***	1.246***	1.173***	1.202***
	(0.262)	(0.275)	(0.334)	(0.389)
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 coefficient of variation 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.

7 Conclusion

This paper provides new insights into the wage-setting process in informal spot labor markets, where workers negotiate directly with firms for low-skill, short-term jobs. These markets are characterized by an excess supply of labor, with many workers returning home without securing employment. Despite the expectation of high competition due to the substitutability of workers, our findings reveal that undercutting on wages is relatively uncommon, occurring in only 26% of negotiations. This challenges the prevailing notion that informal labor markets operate under conditions of perfect competition where wages are bid down to the competitive equilibrium.

A key contribution of this study is the identification of heterogeneity in undercutting behavior across job types. Workers are twice as likely to undercut for *fixed work* contracts ($\sim$ 40%) as compared to *fixed hour* contracts (21%). This difference is robust to controls for the per-person value of the contract and fixed effects for the day of the negotiation. Furthermore, it is not driven by differences in worker preferences for specific contract types, as evidenced by survey data showing that workers competing for both job types come from the same population. Instead, we find that this differential undercutting behavior can be explained by differences in the dispersion of reservation wage distributions across job types.

Our theoretical model helps to rationalize these results. The reservation wage of a worker depends on factors such as their daily consumption needs, a mark-up on consumption, the cost of effort, and the value of leisure. For *fixed hour* contracts, where workers are required to work eight hours with no variation in hours or effort, the costs and benefits are relatively uniform across workers, leading to a reservation wage distribution that mirrors the distribution of consumption. In contrast, *fixed work* contracts allow workers to trade higher effort for more leisure hours, creating greater variation in costs and benefits based on individual ability. Higher-ability workers can achieve greater returns in leisure for the same level of effort, leading to a more dispersed reservation wage distribution. As our model predicts, this dispersion drives higher rates of undercutting for *fixed work* contracts.

These findings contribute to several important strands of the literature. First, we extend the empirical understanding of wage setting in informal labor markets, providing evidence that undercutting is uncommon even in highly competitive environments. This result aligns with earlier work by Breza et al. (2019), which highlights the role of social norms and wage floors in agricultural labor markets. However, our setting differs significantly, as workers in urban spot markets are less likely to know one another, reducing the enforceability of social sanctions. Despite these differences, we observe a persistent wage floor, with workers often refusing to work below this threshold, even at the cost of remaining unemployed.

Second, we contribute to the theoretical literature by introducing a model that emphasizes the role of leisure and effort in shaping reservation wages. Our framework accounts for variations in ability and their interaction with contract types. This approach provides a novel explanation for the observed differences in undercutting behavior across *fixed hour* and *fixed work* contracts. The model also underscores the importance of considering non-monetary factors, such as the value of leisure, in understanding labor market outcomes in informal economies.

Third, we contribute to the literature on contract theory by showing that informal firms optimize their choice of contracts based on job characteristics. Consistent with the multi-tasking model of Holmstrom and Milgrom (1991), firms in our setting tend to offer *fixed hour* contracts for jobs involving multiple tasks, where effort is difficult to monitor and incentivize, and *fixed work* contracts for single-task jobs, where outcomes are easier to assess. This equilibrium behavior highlights the role of task complexity and monitoring in shaping contract design, even in informal labor markets.

Additionally, we provide empirical evidence on the relationship between reservation wage dispersion and undercutting. Using data on workers' beliefs about reservation wages and going wages for different job types, we show that the coefficient of variation for reservation wage beliefs is significantly higher for *fixed work* jobs than for *fixed hour* jobs. This sta-

tistical measure of dispersion is positively and significantly associated with the extent of undercutting, suggesting that higher dispersion in beliefs makes undercutting more likely. Even in the presence of costs such as social sanctions, workers are more likely to undercut when they perceive the negotiated wage to exceed their reservation wage.

The findings from this study have several broader implications for understanding labor markets in low and middle-income countries. Despite the lack of formal institutional safeguards, informal spot markets exhibit structured behaviors in wage setting and contract choice. The persistence of a wage floor, even among workers who incur significant travel costs to access these markets, underscores the role of non-market forces such as social norms and worker expectations in shaping labor market outcomes. At the same time, the heterogeneity in undercutting behavior highlights the importance of job characteristics and worker ability in influencing wage negotiations.

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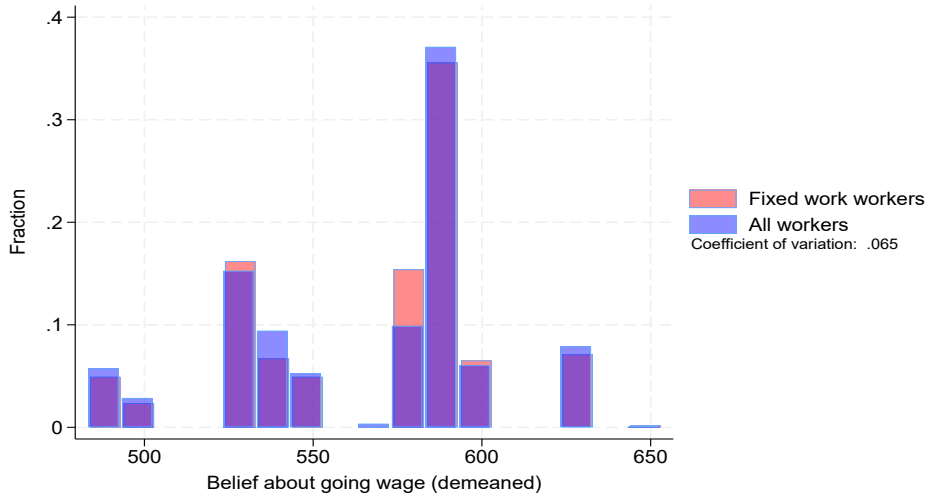
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Part I

Appendix

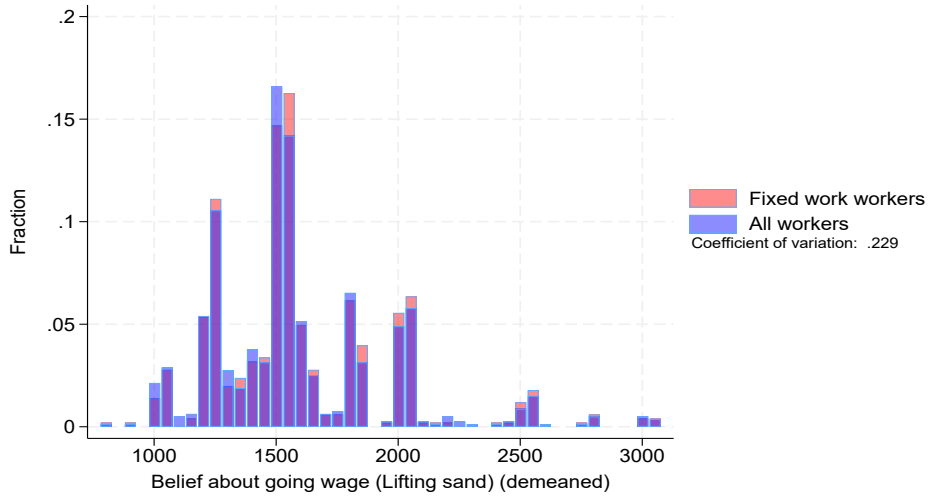
A Additional Figures

Figure A-1: Distribution of beliefs about wage floor of fixed hour work (Demeaned)

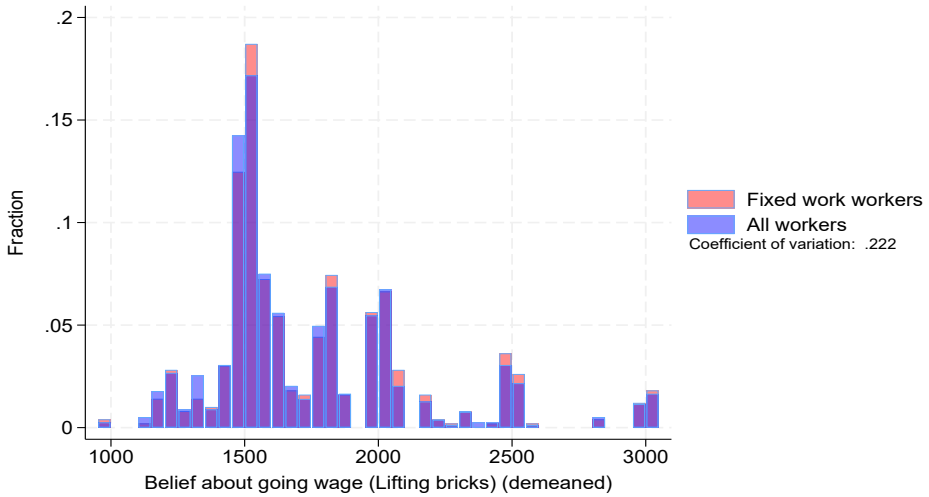


Notes: The figure shows data from a survey of workers conducted between May-August 2024. The figure captures response to the question: *What is the prevailing wage in the market for daily wage work?*. Each bar captures response within a width of 10 INR. Values are demeaned for market FE. Data is winsorized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

Figure A-2: Distribution of beliefs about wage floor for fixed work jobs (Demeaned)



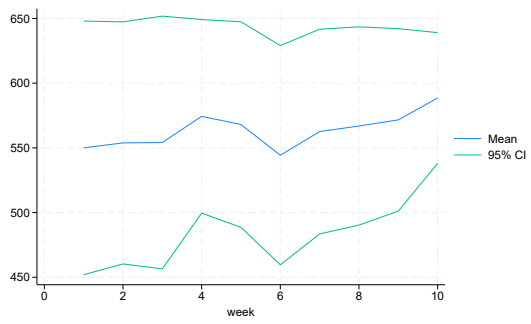
(a) Lifting sand



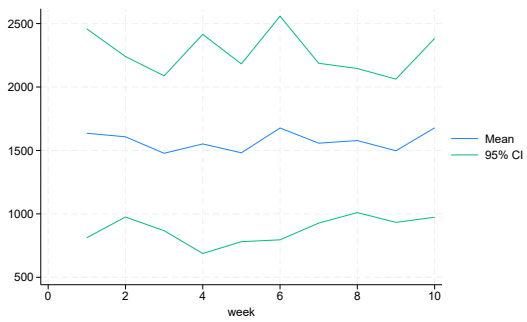
(b) Lifting bricks

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%.

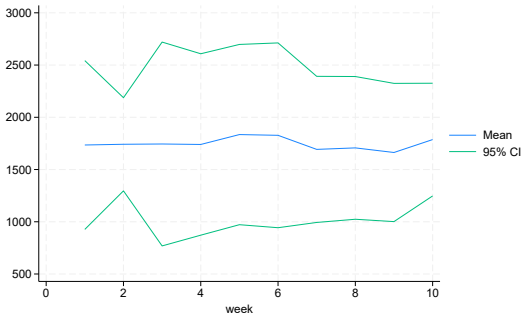
Figure A-3: Average beliefs over time



(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%.

B Robustness checks

Table B-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 B-2: 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 B-3: 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 B-4: 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.

C Data Collection

C.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 if 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.