Working paper

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The Determinants and Implications of Worker Turnover in a Nascent Industry[*]

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Abstract

In this paper we analyze the determinants of turnover in the Ethiopian garment industry. We find suggestive evidence that turnover is costly for both workers and firms. To increase turnover we conduct a pilot field experiment. We compare the effect of a retention bonus schemes and an unconditional bonus payment on worker retention. Surprisingly, we find no statistically significant difference in three months retention rates between the two bonus schemes. Comparing the experimental cohorts to previous cohorts, we find strong differences in retention rates. This suggests that low wage levels might be the main reason for high turnover. We use these findings to design a field experiment that will allow us to characterize the welfare implications of turnover.

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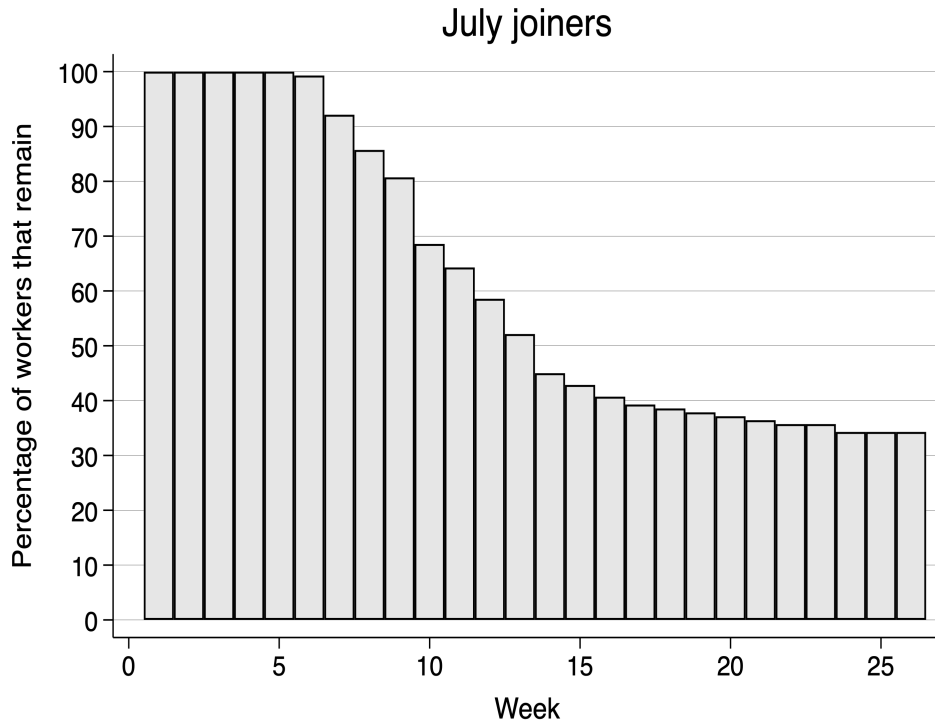[¶]University of Oxford. Email: lukas.hensel@economics.ox.ac.uk.

1 Introduction

Worker turnover is major problem for firms in Ethiopia (Blattman and Dercon, 2019). Turnover increases hiring costs, makes it hard for firms to plan production, and decreases incentives to invest in firm-specific skills. In Ethiopia, worker turnover is perceived to be one of the key obstacles to the development of a thriving manufacturing sector. While, in theory, turnover can be efficient by improving match quality of time (Jovanovic, 1979). However, this relies on unbiased beliefs, firms' abilities to offer differentiated wages, and the absence of hiring and firing frictions (Jäger et al., 2019). Given the assumptions required for this theoretical result, turnover is often thought of an important cost factor for firms (Hoffman and Burks, 2017; Kuhn and Yu, 2019) This research project aims to quantify the (potential) welfare cost of turnover for both workers and firms in a newly opened industrial park in Ethiopia. For this purpose, we cooperate with a large firm in the ready made garment industry in Hawassa industrial park, Ethiopia.

Our cooperation partner is broadly representative in terms of size and economic activity for other firms in this and similar industrial parks in Ethiopia. Figure 1 shows that turnover rates at the firm are high, with more than 40% of workers having left after just 12 weeks.

Given that worker workers are hardly productive in the first 8 weeks of their employment spells as they have to be trained. These high levels of early turnover apparent from Figure 1 are a strong indication that turnover is indeed inefficient in this context.

Figure 1: Retention over time

Notes: Notes: This figure displays retention of workers who joined the firm in July 2018.
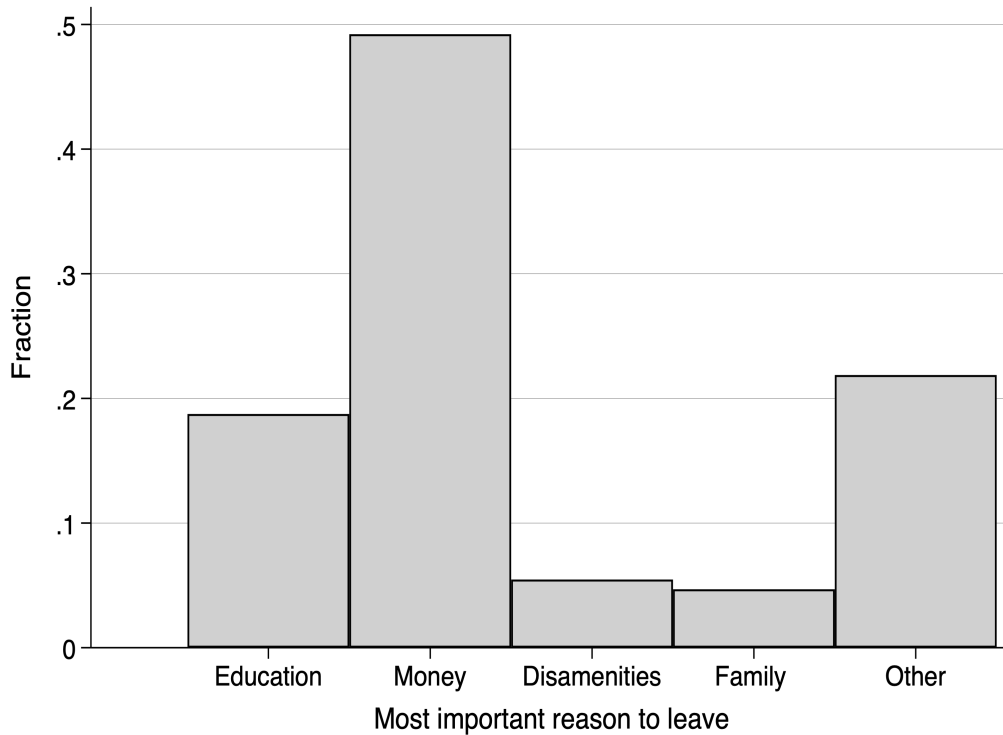
2 Determinants of turnover

To shed light on the efficiency of the worker decision, we analyze the determinants of turnover. For this purpose, we collected data in two ways. First, we conducted a survey 128 workers who the left the firm between September and November 2018 to get a descriptive understanding of why people left. We also conducted a survey with 188 workers who joined the firm between September 10th and October 10th 2018 (we ran a pilot experiment with this cohort which is described in Section 3). We use this data to find correlates of turnover.

Figure 2 summarizes what workers who left the firm told us about why they left our partner firm. A large majority of workers mentioned low salaries as their main reason to leave the firm. Entry level workers are, on average, paid 1250 Ethiopian Birr per month (about 45 dollars). With rent costing up to 700 Birr per month, most workers struggle to

save anything on these salaries. In light of these numbers, high turnover might be rational from the worker. However, as money can in principle compensate for bad amenities, this does not reveal the true drivers of high turnover.
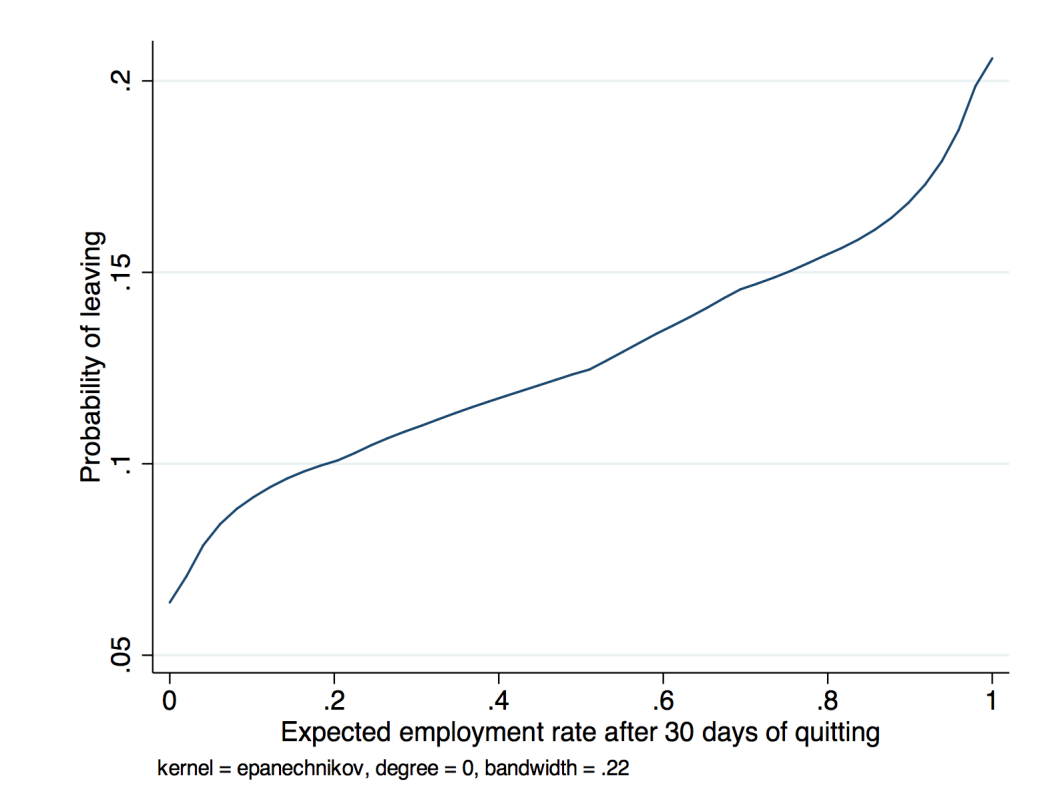
Figure 2: Self-reported reasons to leave job

Notes: Notes: This figure displays reasons of leaving their job at our partner firm among the sample of surveyed leavers.

Biased beliefs about outside options are a salient reason why turnover could be inefficient from the workers' side. We ask about the perceived job-finding probability 30 days after leaving. They belief that 50% of workers leaving the firm will be able to find a new job within 30 days. This is about twice the rate of the realized values of actual leavers. Hence, workers are overoptimistic about their options. Figure 3 shows that these biased beliefs might be important. We observe a strong positive relationship between the perceived outside options and the probability of leaving the firm. Taken together, we think that turnover is likely to be inefficiently high for firms and workers in our context.

Figure 3: Non-parametric relationship between perceived outside

kernel = epanechnikov, degree = 0, bandwidth = .22

Notes: Notes: This figure displays the non-parametric relationship between beliefs about the employment rate 30 days after leaving the firm and the likelihood to have left 6 months later.

3 Pilot experiment

To test ways of increasing the retention for firms we implemented a pilot experiment to the effect of a retention bonus against an unconditional cash transfer payment on retention rates. For this purpose we cooperated with a large firm in the ready made garment business in Hawassa industrial park, Ethiopia. The experimental sample consists of a random sample of 188 workers that joined the company between September 10th and October 10th 2019. Before the randomization, we conducted an extensive baseline survey with all sampled individuals. We then randomized sampled workers at the individual level to be part of one of the following groups.

- **Treatment group**

  Workers in the treatment group where eligible for a 1250 Birr (45 USD) bonus

payment if they stayed at least three months at the firm. They were told that the payments would be implemented after the end of the three month period.

- **Control group**

  Workers in the treatment group where eligible for a 1250 Birr (45 USD) bonus payment regardless of their tenure at the firm. They were told that the payments would be implemented after three months.[1]

The amount of 1250 Birr is calibrated to match the average monthly wage of workers at our company. Our main outcomes of interest are administrative retention data provided by the firm. Furthermore, we conducted an endline survey with sampled workers after about in March 2019 (about 6 months after the baseline).

Experimental integrity Overall, our experiment worked. The randomization was successful. We find no significant imbalances for individual covariates or at the overall level in table 1. We manged to follow up with 162 workers which is an attrition rate of 13.8%. We find no significant difference between treatment and control individuals ($p = 0.675$). Furthermore, attrition is only an issue for outcomes measured in the endline survey. This leads us to think that selective attrition is unlikely to influence our results.

3.1 Empirical analysis

To analyze treatment effects for the pilot experiment we use the following regression equation:

$$y_{it} = \beta_0 + \beta_1 treat_i + \beta X_i + \varepsilon_{it} \tag{1}$$

where y_{it} is the outcome of interest, $treat_i$ is a treatment dummy, and X_i are a set of control variables. We use heteroskedasticity robust standard errors for inference. Results of the analysis are displayed in table 2.

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[1] We did not include a pure control group as our partner firm was worried about not offering any bonus scheme to a subset of study participants.

Table 1: Balance: pilot experiment

| | Mean and Standard Deviation | | N | Imbalance (p) |
| | Control | Treatment | | |
	(1)	(2)	(3)	(4)
Age	19.54	19.48	188	0.82
	(1.78)	(2.02)		
Protestant	0.81	0.79	188	0.72
	(0.40)	(0.41)		
Orthodox	0.07	0.07	188	1.00
	(0.26)	(0.26)		
Main language is Sidamigna	0.63	0.68	188	0.44
	(0.49)	(0.47)		
Main language is Wolaytigna	0.12	0.11	188	0.82
	(0.32)	(0.31)		
Distance from place of birth (hours of travel)	2.91	2.89	187	0.94
	(1.98)	(1.99)		
Rural place of birth	0.61	0.60	187	0.81
	(0.49)	(0.49)		
Desired age next child	25.26	25.37	187	0.79
	(2.30)	(3.37)		
Studied beyond high school	0.21	0.22	188	0.86
	(0.41)	(0.42)		
Went to bed hungry last week	0.32	0.32	188	1.00
	(0.47)	(0.47)		
Has previous work experience	0.05	0.06	188	0.76
	(0.23)	(0.25)		
Tenure in current job (weeks)	3.63	3.74	188	0.77
	(2.19)	(3.23)		
Works as sower in current job	0.81	0.76	188	0.38
	(0.40)	(0.43)		
Expected wage in current job after four months	1640.74	1662.77	188	0.76
	(532.69)	(468.12)		
Expected employment rate one month after quitting	0.50	0.54	188	0.33
	(0.24)	(0.23)		
Satisfied with workplace physical comfort (max 4, min 1)	2.18	2.31	188	0.34
	(0.90)	(0.92)		
Satisfied with workplace access to water (max 4, min 1)	1.63	1.63	188	1.00
	(0.89)	(0.82)		
Satisfied with workplace toilets (max 4, min 1)	1.45	1.44	188	0.93
	(0.74)	(0.82)		
Feels discriminated on the workplace	2.70	2.84	188	0.41
	(1.15)	(1.14)		
Job satisfaction compared to other available jobs (max 10, min 0)	6.24	6.20	188	0.89
	(2.20)	(2.04)		
Expected change in job satisfaction after 4 months	0.77	0.88	188	0.56
	(1.35)	(1.39)		
Depression score (max 40, min 10)	14.48	14.84	188	0.74
	(7.18)	(7.47)		
How long expects to work with current employer (months)	31.47	29.59	187	0.59
	(23.69)	(24.20)		

Overall balance (p): 1.00

Notes: Notes: In this table we analyze covariate balance in the pilot experiment. In columns 1 and 2 we separately report the mean and standard deviation of each variable for the treatment and control group. In column 4 we report the p-value of a balance test. In the last row of the table, we report a joint test of orthogonality (following the recent literature, e.g. McKenzie (2017)). To perform this test, we regress the treatment variable on all covariates and we then test the joint hypothesis that all covariates have a coefficient equal to zero.

We find no evidence that the retention bonus increased retention over the unconditional bonus payment. We observe slightly negative but not significant treatment effects

at all points of time. This is surprising given the clear theoretical prediction of an increase in the retention rate. While the statistical power of this analysis is limited, we

We can rule out that this result is driven by workers misunderstanding the conditionality or that workers in the treatment group felt treated unfairly. When asked whether about the conditionality of the bonus in the endline survey, more than 85% of workers responded correctly. Furthermore, 85% of workers stated to understand the bonus scheme well or very well. This makes it very unlikely that a misunderstanding of the bonus treatment caused the observed treatment effects. We also find no evidence for the role of fairness norms. 85% of workers in the treatment group and 86% of workers in the control group perceived the bonus as fair.

Table 2: Main results: pilot experiment

	Dependent variable: retention dummy			
	after 14 weeks	after 16 weeks	March 2019	June 2019
Treatment	-0.018	0.015	-0.013	-0.062
	(0.058)	(0.064)	(0.064)	(0.073)
Control mean	0.819	0.734	0.768	0.511
Observations	188	188	162	188

Notes: Notes: In this table we analyze treatment effects on retention in the pilot experiment. In columns 1 and 2 we report treatment effects on retention 14 and 16 weeks after joining using administrative. In column 3 we report treatment effects on self-reported retention in the endline survey (March 2019). In column 4 we report retention in June 2019 using administrative data. All regressions include the following controls: week of joining dummies, age, gender, and whether they had any previous work experience. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

To analyze whether we the cash payment changed retention regardless of the conditionality, we compare not individuals that were not part of the study to sampled individuals. Specifically, we compare individuals who joined the company between September 1st and September 9th, 2018 to study participants who joined the company right after September 9th. Given that we do not observe differences between the control and treatment groups in the pilot experiment, we pool them for this analysis. This comparison is not causally identified but given the temporal proximity we argue that they constitute a useful counterfactual. Table 3 reports differences in retention rates between study participants. Participants in the study are 21.5 percentage points (36%) more likely to stay at the firm.

This effect is highly significant and persists to 6 months after the end of the study in June.

Table 3: Comparison to non-participants: pilot experiment

	Dependent variable: retention dummy		
	after 14 weeks	after 16 weeks	June 2019
Study participant	0.215***	0.176***	0.099*
	(0.053)	(0.055)	(0.057)
Control mean	0.593	0.569	0.390
Observations	123	123	123

Notes: Notes: In this table we compare cohorts that were eligible to participate in the pilot experiment (those who joined between September 10th and October 10th) to workers who joined between September 1st and 9th. In columns 1 and 2 we report treatment effects on retention 14 and 16 weeks after joining using administrative. In column 3 we report treatment effects on self-reported retention in the endline survey (March 2019). In column 4 we report retention in June 2019 using administrative data. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This suggest that simply increasing the overall wage level might be sufficient to increase worker retention. Given the large size and persistence of the non-experimental treatment effects, an increase in the base-wage or the introduction of retention bonuses might help firms in Ethiopia to tackle the high turnover levels. Comparing the cost-effectiveness of base-wage changes and retention bonuses, our results suggest that a retention bonus might be better as it only has to be paid to retained workers.

4 Final experimental design

The research conducted to date has led us to develop a modified experimental design to analyze the welfare consequences of turnover. We have already documented the presence of biased beliefs of workers. Furthermore, anecdotal evidence from interactions with HR managers at cooperation partner suggest inefficient behavior by low- and mid-level managers. Thus, turnover is likely to have negative welfare consequences in our context. To assess welfare, one has to study total surplus generated by the labor market match. We will also offer structural estimates of the correlation between worker and firm surplus. These are key objects of interest in the recent labor economics literature (e.g. Jäger et al.

(2019) and Caldwell and Harmon (2019)).

We propose a design that will allow us to study the effect of turnover on both the worker surplus and the firm surplus. To do so, we offer workers the choice from a menu of potential retention bonuses. These will allow us to analyze both the reasons behind turnover and the associated costs. Specifically, we offer new workers at the firm the following choices.[2]

Table 4: Bonus choices elicited

	Option 1	Option 2	Option 3
Main choice	870 Birr after three months; stay three months	1250 Birr after five months; stay five months	1790 Birr after seven months; stay seven months
Deferred payment choice	870 Birr after seven months; stay three months	1250 Birr after seven months; stay five months	1790 Birr after seven months; stay seven months
Commitment choice	1250 Birr after three months; stay three months	1250 Birr after five months; stay five months	1250 Birr after seven months; stay seven months

We will elicit all choices for all participants. To ensure incentive compatibility, we will implement each choice with a positive probability for all surveyed workers. We will randomize individuals in the following groups:

- **Treatment group**

  Workers in the treatment group will be eligible for a randomly selected bonus scheme *that they did not choose* in the main choice.

- **Control group**

  Workers in the treatment group will be eligible for the bonus scheme *that they chose* in the main choice.

- **Incentive compatibility group**[3]

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[2] We calibrated the amounts so that the average worker should be indifferent between secure payments in the first choice.

[3] For power reasons we will only randomize a small percentage of individuals to this treatment group.

Workers in the treatment group will be eligible for the bonus scheme *that they chose* in either the deferred payment choice or the commitment choice.

Our main comparison of interest is between individuals in the control and treatment groups who made the same choice in the main choice treatment.

We will use this design to test the following hypotheses:

1. The smart bonus will reduce the duration of employment among workers who choose the early date and increase the duration of employment among workers who choose the late date. For workers choosing the medium choice, the effect will depend on the random assignment.

2. The workers retained will be more productive and more motivated to pursue a career in the manufacturing sector.

The use of the strategy methods allows us to separately estimate treatment effects on turnover for workers who choose the early date and workers who choose the late date. This will enable us to test hypothesis (1).

To test hypothesis (2), we will collect four measures of worker ability and productivity: a dexterity test commonly used in the garment industry, supervisor ratings of workers, spot checks of individual level productivity, and absenteeism rates. We will use these measures to construct a measure of 'quality adjusted tenure' for each worker to assess the overall impact of the intervention. Further we will collect information about aspiration and career plans.

The smart bonus may also have a second effect: it may help act as commitment device that helps workers with self-control problems stay at the company (in the spirit of Kaur et al. (2010)). To assess this possibility, we will use the commitment choices.[4] Participants without self-control problems should always choose the earliest possible payoff date. Participants who have a demand for commitment may instead choose later dates.

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[4] Another potential reason for inefficient turnover are self-control problems. Workers intend to stay for 28 months. Given the observed retention of about 50% of out experimental sample after 8 months, this seems overly optimistic.

To assess the role of liquidity constraints, we will analyze the deferred payment choices. This choice enables us to analyze whether the payment date drives workers decisions for late or early retention bonuses in the main choice. Hence, it allows us to analyze the role of liquidity constraints in workers choices and retention decisions.

Finally, we plan to use the exogenous variation generate by the experiment to estimate a structural model of job exit decisions. This will enable us to:

1. Quantify the correlation between worker surplus and firm surplus among marginal workers;

2. Study counterfactual policies (e.g. a single retention bonus that will only work for high surplus types)

Put together, this experimental design allows us to disentangle the different factors determining retention choices of workers. Furthermore, the expected exogenously induced variation in tenure allows to estimate structural models to assess firm and worker surplus and, ultimately, the welfare consequences of turnover in our setting.

5   Conclusion

We have argued that turnover in the nascent ready made garment industry in Ethiopia is likely to be costly to both workers and firms. However, so far we were only able to provide correlational evidence on the cost of turnover. Hence, we present the design of an experiment that will allow us to provide a causal assessment of the cost of turnover. We will be able to estimate the correlations between firm and worker surplus and characterize the selection into staying at the company.

Even absent further evidence, the prominent role of industrialization in Ethiopia's national development strategy, labor retention is is and should be a policy priority. Our non-experimental results suggest that interventions that increase the wage (eg through minimum wage laws) has the potential to substantially decrease labor turnover.

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