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Returns to Capital for Whom? Experimental Evidence from Small Firm Owners and Workers in Ghana*

Morgan Hardy, Jamie McCasland, Jiayue Zhang

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Abstract

We document capital contributions from workers to their employers in a representative sample of small firms. We then conduct a two-sided experiment in a sample of small employers within industries where this contract type is relevant, randomizing cash transfers to firm owners or a randomly selected worker. Relative to the control group, transfers to either party increase firm profits in equal magnitude. Treated owners purchase additional business assets; treated workers purchase business assets that are used in their employing firm. Our findings suggest widespread household-level cash transfer programs may yield spillover benefits to firms that flow through the labor market.

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*Hardy: New York University Abu Dhabi, morgan.hardy@nyu.edu. McCasland: University of British Columbia, Vancouver School of Economics, jamie.mccasland@ubc.ca. Zhang: Brown University, jiayue.zhang@brown.edu. We are grateful to Charles Sefenu, owner of Data Pivot Ghana, and his excellent enumeration team for their invaluable assistance with fieldwork. We thank Pulkit Aggarwal, Erin Litzow, and Everett Stamm for excellent research assistance. We thank Rocco Macchiavello and seminar participants at Brown University, the University of British Columbia, New York University, Dickinson College, PacDev, and the Organizing Development and Development of Organizations (ODDO) conference at LSE for helpful comments. We gratefully acknowledge funding from the Center for Innovative Data in Economics Research (CIDER) at the University of British Columbia, New York University Abu Dhabi Tamkeen Research Institute Award CG005, the Jobs and Opportunities Initiative (JOI) at the Abdul Latif Jameel Poverty Action Lab (J-PAL), and the Private Enterprise Development in Low-Income Countries (PEDL) Initiative. Fieldwork received ethics approval from the New York University-Abu Dhabi Research Ethics Committee (protocol #HRPP-2021-103). The RCT was registered with the AEA Registry under AEARCTR-0008833. All errors are our own.

1 Introduction

Individuals and firms are capital constrained in low- and middle-income countries, potentially hampering productive household-level investments, firm productivity, and firm growth (Bloom et al., 2010, Balboni et al., 2022). Cash transfers to small firm owners have been shown to yield large returns on investment (De Mel et al., 2008). Similarly, cash transfers to households yield increases in productive assets and income from self-employment at the household-level (Haushofer and Shapiro, 2016). These widespread household-level cash transfer programs have also been shown to yield spillover benefits to firms unrelated to direct investments from self-employed households, suggesting impacts that flow through market forces (Egger et al., 2022).

In this paper, we show that relaxing capital constraints for individuals can improve firm outcomes by *directly* relaxing capital constraints for firms in which they are employed, because workers supply both labor and capital to their employers. We document the prevalence of this contract type within some industries in an Accra suburb and then report results from a two-sided experiment that randomized cash transfers to firm owners or a randomly selected worker in a sample of small employers from relevant industries across Ghana. Firm profits rise in equal magnitude in response to cash transfers, regardless of the recipient, suggesting that in an environment of widespread capital constraints, transfers to individuals can yield spillover benefits to firms that flow through the labor market.

Our descriptive data comes from a listing of the universe of firms (and firm owners) in a peri-urban area close to Accra. We conduct a labor roster with these firm owners, asking whether or not each worker in their primary firm also supplies capital, allowing us to generate representative estimates on the frequency of this contract type across industries. We uncover a pattern, echoed by our experimental sample, in which workers supply both labor and capital in industries in which there are large complementarities between labor and capital.

Reassured by the prevalence of this phenomenon in representative data, we report the results of a field experiment in a sample of small employers in these industries drawn from around Ghana. The experiment focuses on three industries in which this

organizational structure is prevalent: garment-making, cosmetology, and carpentry. Focusing on firm-worker matches that predate the experiment, we randomize firms into one of three groups: cash transfer to firm owner, cash transfer to worker, or a control group. In the cash transfer to worker group, we use a second randomization to select one worker per firm to receive the transfer. Transfer amounts of 700 GhC are equivalent to about 22% of baseline median capital stock and about 14 months of baseline median wages for workers in the sample.

Our key experimental findings are three-fold. First, workers in the worker transfer group purchase trade-specific capital assets that they use in their employing firm. 53% of workers who received transfers report purchasing some trade-specific capital and retention across rounds is about 86% in all three treatment groups. Among those still working at the sample firm at the end of the study, the worker transfer treatment more than doubles the amount of trade-specific capital contributed to the firm by the worker. Our experiment did not introduce the organizational structure in which workers supply both labor and capital, instead it experimentally accelerates and magnifies the use of that system by relaxing worker liquidity constraints.

Second, firms experience large upstream benefits from access to worker capital, equivalent to those experienced by firms in which the firm owner was the recipient of the transfer. While firm-owner reported assets (and new hires) increase in only the firm-transfer treatment group, profits increase in both the firm-transfer and worker-transfer treatment groups in almost identical magnitude (about 13%). We also find that firm sales and firm gross profits (profits plus the wagebill, a measure of total surplus) increase by about 13% in response to both treatments, relative to the control group. We also find both treatments increase worker-reported contributions to output by about 13%. We find no impact of the worker-transfer treatment on worker mental well-being, food consumption, or work outside the reference firm, suggesting it is worker-capital that complements existing labor productivity to generate these upstream benefits.

Third, downstream benefits of the firm transfer to existing workers are limited. In the transfer to firm owner group, we see no increase in the wages of reference workers, despite increases in both firm profits and a worker-reported measure of worker productivity. We thus find no evidence that cash transfers to firm owners are subject to

sharing pressure.¹ We also find no evidence that firms in this context face an upward-sloping labor supply curve; firms in the firm-transfer group experience an exogenous productivity shock (in the form of additional capital) and an increase in firm size, but no increase in wages for the reference worker.² Workers in the worker-transfer group do experience statistically significant wage increases, but the vast majority of the new surplus generated by the cash transfer is captured in profits taken home by the firm owner.

Although an established literature has examined organizational structure of (large) firms within high-income country contexts (Gibbons and Roberts, 2013), relatively little work has focused on organizational structure among small employers in low- and middle-income countries.³ A primary reason for the limited evidence is that it can be difficult to generate a sample of this type. Census or representative sampling generates samples in which a large majority of the firms are composed of only the self-employed owner and studies on large formal firms tend to focus on one or a handful of large employers. Despite this paucity of evidence, these employment relationships are quantitatively meaningful to the functioning of the private sector in low- and middle-income countries. In Ghana, a third of all wage employees work in firms with fewer than 10 workers (the typical definition of a small employer) (Teal, 2023). This paper is the first to explore an organizational structure in which workers supply both labor and capital among small employers in a developing country. From a policy perspective, our study suggests that household- and individual-level cash transfer programs can yield spillover benefits to the productivity of the private sector that flow through this type of organizational structure in the labor market.

¹See for example (Carranza et al., 2022) and (Squires, 2023) for evidence on the effects of kinship taxation pressure on labor supply and (micro) firm profitability, respectively. In qualitative interviews before our experiment, some firms owners suggested that one reason they shy away from hiring more workers is that workers become the de facto responsibility of firm owners. This finding is thus a priori an empirical question.

²A growing literature from around the world (from mostly larger firms) has found that wages respond to firm-specific demand or productivity shocks. See (Carvalho et al., 2022) for a nice example of demand shocks yielding wage increases without firm size effects and (Amodio and De Roux, 2023, Card et al., 2016, Kline et al., 2019) for evidence of monopsony power.

³An important exception is Bassi et al. (2022), who show the presence of an active capital rental market among small manufacturing firms in Uganda, allowing firms to access high-value machinery despite small scale.

2 Descriptive Evidence on Organizational Structure

2.1 Firm Census Evidence

Before turning to our experiment, we first document the existence of the organizational structure we study, that workers in small firms supply both labor and capital, using a representative sample of the universe of firms in Aburi, Ghana, a suburb of approximately 20,000 people 45 minutes outside of Accra. In June 2022, our survey team conducted a firm listing exercise, approaching every permanent enterprise structure and every fifth household structure (to inquire about firms without a permanent enterprise structure).⁴ This listing identified 1,601 firm owners.⁵ In June 2023, our survey team collected a worker roster of all individuals contributing positive labor inputs to the these owners' primary businesses during the previous month that included a question on whether the worker also supplied capital to the firm during the previous month. We captured 1,550 firm owners' responses for a 97% tracking rate.⁶ The worker roster identified 272 employers and 555 workers.⁷

By broad industry category, Figure 1 displays the ratio of employers with any capital contributions from workers (Panel (a)) and the ratio of workers who supply both labor and capital as a share of all workers (Panel (b)). Among workers supplying capital, the mean (median) amount supplied is 781 GhC (750 GhC). Firm-owner reported assets, which implicitly exclude any capital supplied by workers, have a median of 3,000 GhC in the full sample of firms and 8,800 GhC in the sample of employers. Among firms and industries where this organizational structure exists, it constitutes an economically meaningful share of total assets available to the firm, which are otherwise

⁴This listing method produces a sample of all owners of firms found in permanent structures and every fifth owner of exclusively household-based or mobile firms. Sampling weights reflecting these differing sampling frequencies for owners of firms found in permanent structures (100%) and owners of exclusively household-based or mobile firms (20%) are applied to all analysis with these data.

⁵Sample inclusion required that the firm owner had an operational business as of May 2022 and that they anticipated would be operational in the following six months. An estimated 6.2% of owners had more than one eligible business; owners were asked to indicate which business was considered their primary business.

⁶Note that we did not census new businesses that could have opened between June 2022 and June 2023. However, in June 2022, only 3.8% of workers were employed in non-primary businesses or firms under 1 year of age, making this sampling restriction unlikely to impact representativeness.

⁷See Appendix Tables A1 for firm-level summary statistics.

unreported and unstudied in the firm production function.

2.2 Industry Heterogeneity

Worker capital contributions are clustered in industries in which there are large complementarities between labor and capital. Garment-making requires a sewing machine; a skilled or semi-skilled worker without access to a sewing machine is functionally useless and a sewing machine without an operator is likewise functionally useless. Auto mechanics, carpentry, and cosmetology have a similar production structure, though perhaps less obviously. Commonly reported trade-specific asset holding includes pliers and cutters in auto mechanics, planers and saws in carpentry, and roller-setting and scissor sets in cosmetology. We see no evidence in our representative data of worker capital contributions in retail-type industries (Food, Retail, Mobile Money, Handicrafts), no evidence of worker capital contributions in manual labor-intensive work (Masonry), and no evidence of worker capital contributions in skilled trades with particularly costly machinery (Welding, Electrician). These findings suggest that in order for this organizational structure to arise, there must be complementarities between labor and capital, but also trade-specific capital must be divisible, such that a worker can divisibly own his or her own machinery. Here again garment-making, the most common skilled manufacturing or services industry in most samples of small firms in low- and middle-income countries, is the canonical example; each worker in a firm can own their own sewing machine.

3 Experimental Design

3.1 Sample

Generating a sample of small employers is a challenge, as block-by-block business censuses in low- and middle-income countries typically yield a plurality of single-person firms and formally registered firms tend to be much larger. Sample construction for the experimental portion of this study thus began with an existing sample of known

small employers.⁸ The sample is drawn from 32 districts around Ghana, designed to generate representation across rural and urban areas, and across all regions of Ghana.⁹ Prior to this study, the research team last interacted with this sample of firms in 2015 and sample construction for the experimental study in this paper began in August 2020. At that time, all firms were contacted by phone for a COVID-19 related survey. Importantly for the sample construction of this study, we conducted a worker roster, which included all paid workers in the firm as of June/July 2020.¹⁰

The experimental sample in the paper consists of 356 firms across three skilled manufacturing and services industries in which workers in our representative sample routinely supply both labor and capital: garment-making, cosmetology/hairdressing, and carpentry. The original experimental sample also included 82 firms in two additional skilled trades: welding and masonry. In this dataset where we have a larger number of firms in these five industries, we can explore why welding and masonry may not be industries with high concentrations of this organizational structure. As mentioned above, masonry as practiced in low- and middle-income countries is often quite labor intensive. In Figure 2 Panel (a), we show the ratio of the wagebill to assets at baseline; masonry is a clear outlier in this sample. In Figure 2 Panel (b), we show the ratio of machinery to total firm size; here welding is an outlier; many welders have a single or a few large and expensive machines rather than a series of small pieces of equipment divisibly used by individual workers.¹¹ To focus on understanding labor supplied with capital, an organizational structure previously unexplored in the literature, we drop these 82 firms and the associated experimental strata from all analysis in this paper.

⁸These small employers originally entered the sample for (Hardy et al., 2019) and (Hardy and McCasland, 2023) in 2013 when they were recruited to participate in a worker placement program. (Hardy and McCasland, 2023) shows that firms in the sample are representative of small employers in Ghana.

⁹The districts are a population-weighted random sample of districts from the original government-run worker placement program. The replication package for district sample selection can be found on the Inter-University Consortium for Political and Social Research (ICPSR) American Economics Association (AEA) data repository (Hardy and McCasland, 2022).

¹⁰In related work, we argue that the acute COVID disruption in Ghana lasted only a few months and was mostly resolved by June/July 2020, although longer-term economic disruptions related to the global macro-economy continue to this day (Hardy et al., 2023).

¹¹A logistical point with respect to welding and our experimental design is that welding machinery costs exceed the size of the cash transfer provided by the experiment, making acquisition of meaningful additional capital somewhat unrealistic for cash recipients.

Each firm in the final experimental sample includes at least one paid employee whom the firm owner anticipated would still be working with the firm six months from the time of the survey, both at the initial worker roster in August 2020 and in the November 2021 baseline survey.¹² In practice, this means that our sample inclusion criteria generates a sample of workers with a tenure of at least a year, because workers had to appear as paid employees in the COVID survey worker roster and remain at the firm as paid employees through November 2021. Mean (median) tenure among all workers (in all firms) in the worker roster as of the COVID survey was 2.6 years (2 years), and mean (median) tenure among the workers in the experimental sample as of the COVID survey is 2.7 years (2 years), suggesting our inclusion criteria selected workers with similar tenure to the pool of all workers in these small employers.¹³

Within the set of eligible workers identified through the original COVID worker roster who remained at the firm through November 2021, we randomly selected up to two workers for inclusion in the November 2021 baseline survey and in the experimental study. About half of the firms in our study had only one eligible worker included in the sample, 13% had two eligible workers who are both included in the sample, and the remainder had more than two eligible workers from which two were randomly selected for sample inclusion.¹⁴ In total, the experimental sample includes 539 workers.¹⁵

¹²Both firm owner and worker were also required to have access to an active mobile money account. These accounts could belong to spouses or family members, but could not belong to colleagues. This sample inclusion criteria excluded 3 potential firm owners and 11 potential workers within otherwise eligible firms.

¹³Bassi et al. (2021) find similarly lengthy levels of tenure in a sample of small employers in urban Uganda, where they argue employment relationships in the informal sector are (perhaps surprisingly) sticky and resilient to shocks.

¹⁴One firm has three workers that were included in the sample, due to a logistical decision for practical purposes near the end of baseline survey data collection.

¹⁵Total firm size averages four workers at baseline excluding the firm owner (See Table A3), which includes workers in our sample, eligible workers who were not randomly selected for inclusion, new hires after the COVID survey, workers who were not paid in either June/July 2020 or August/September/October 2021 (novice workers are often paid tips or “chop money”, which can vary by month), workers who did not anticipate to work in the firm six months from November 2021, and workers who did not have access to an active mobile money account.

3.2 Randomization

We implement a two-stage randomization. Stratified by firm owner gender, skilled industry, having one or more eligible workers, and a broad geographical cut, we randomly assign firms to one of three groups: (1) cash transfer to firm owner (118 firms), (2) cash transfer to worker (118) firms, and (3) a control group.¹⁶ For firms with more than one eligible worker assigned to the worker treatment group, we randomly choose the single reference worker to receive the cash transfer. This design generates four types of workers, which we refer to as firm-treated (178), self-treated (118), peer-treated (61), and control (182). We focus on point estimates on firm-treated and self-treated workers, as point estimates on the peer-treated group are noisy due to its small size.

3.3 Intervention

Firm-transfer firm owners and self-treated workers received an unconditional cash transfer of GhC 700 (\$254 PPP) in early December 2021 via mobile money transfer on the platform of their choice. All other participants concurrently received GhC 20 (\$7 PPP) for their time and as a token of appreciation for their continued participation. The transfer amount is about 15% (22%) of mean (median) assets in sample firms, about 140% (200%) of average monthly firm profits, and about 7 months (14 months) of mean (median) worker wages. Confirmation of cash receipt followed a two-step protocol: we sent a text message concurrent to the cash transfer and all respondents received a phone call within a few days to confirm receipt.¹⁷

The research and program implementation team made no announcements to firm owners or workers regarding the treatment assignment of the firm or the worker (i.e. we did not tell firms when workers “won the lottery” or workers when firms “won the lottery”), though of course private communication was possible. In the final follow-

¹⁶Cosmetology and carpentry are gender segregated, while garment-making includes both men and women. Our stratification therefore produces 16 strata, but one is empty, so our randomization has 15 strata.

¹⁷These calls also asked about any automatically deducted loan repayment from the mobile money providers (who allow users to access credit in this context). This loan repayment issue affected about 11% of firm-transfer firm owners and about 8% self-treated workers. Affected cash transfer recipients reported positive mobile money balances of about 240 GhC after loan repayment.

up survey, over two thirds of cash recipients report that they immediately told their employers or employees that they won the lottery.

3.4 Data

Baseline data was collected in November 2021 referencing firm- and worker-level outcomes in October 2021. Five rounds of follow-up surveys were conducted in January, February, May and July 2022, and January 2023, referencing the previous month in each survey. All primary firm- and worker-level outcomes were measured at baseline and in each follow-up survey with the exception of worker-owned assets. This measure is only collected in the final follow-up survey in January 2023. All financial variables for both firms and workers have been deflated to October 2021.¹⁸

Firm-level outcomes are self-reported by the firm owner, with financial variables at the month level and owner intensive margin labor supply at the week level. Assets are collected as self-reported subgroups (equipment/machinery, tools, inventory, other), with visual aids by industry. Profits and sales are measured using monthly self-reports as in De Mel et al. (2008). We winsorize firm financial outcome measures at 1%.

We attempt a few novel survey-based measures of worker productivity. The most straightforward of these is to ask workers directly “In MONTH, to the best of your knowledge, what were sales earned by the business due to work you completed?”¹⁹ An owner-reported alternative asked owners to allocate their total monthly sales across all workers in the business, including themselves. We also collected owner-reported and worker-reported measures of other primary worker outcomes, including wages and intensive margin labor supply. In our main specifications, we use worker-reports for all worker outcomes, but we report on owner-reports of worker outcomes in the appendix.

In the final follow-up in January 2023, we collect information on cash transfer usage and worker purchase and possession of trade-specific capital. In order to differentiate

¹⁸Note that our nominal transfer amount of 700 GhC in December 2021 is about 680 GhC in October 2021 Ghana Cedis.

¹⁹Bassi et al. (2023) argue that these types of industries in low- and middle-income countries include limited labor specialization because products are bespoke. To the extent that this applies to our setting, we might expect this to be a relatively reliable measure.

between assets that belong to the firm owner but are *assigned* to the worker and assets that truly belong to the worker, we emphasize assets that the worker purchased and would take with them should they exit employment at the firm.

3.5 Attrition and Balance

The cumulative attrition rate over the five follow-up rounds is 2.6% for firm owners and 2.2% for workers. Neither treatment significantly increases attrition relative to control (Appendix Table A2).

We test for baseline differences in firm-level and worker-level characteristics between the two treatment groups of interest and the control group, according to the following specifications, respectively:

$$Baseline_i = \beta_0 + \beta_1 FirmT_i + \beta_2 WorkerT_i + \gamma_s + \epsilon_i \quad (1)$$

$$Baseline_i = \beta_0 + \beta_1 FirmT_i + \beta_2 WorkerT_i + \beta_3 PeerT_i + \gamma_s + \epsilon_i \quad (2)$$

where $FirmT_i$ is a dummy indicating transfer to firm owner, $WorkerT_i$ is a dummy indicating transfer to worker, $PeerT_i$ is a dummy indicating the peer-transfer group, and γ_s are strata fixed effects.

We test 23 firm-level covariates and 20 worker-level covariates for balance across three bilateral group pairings ($\beta_1, \beta_2, \beta_1 - \beta_2$) (Appendix Table A3 and Appendix Table A4). We fail to reject orthogonality for both our 23 firm-level covariates and our 20 worker-level covariates at conventional levels using an F-test of joint significance. We reject zero at the ten percent level for two firm-level covariates, baseline number of workers (β_1), and winsorized firm assets ($\beta_1 - \beta_2$). We reject zero at the ten or five percent level for four worker-level covariates, baseline number of workers (β_1), winsorized firm assets (β_2), worker gender (β_2), and whether the worker's household has a farm (β_1).

3.6 Estimation

We estimate the impact of our cash transfers on firm-level and worker-level outcomes using the following estimation equations, respectively:

$$Y_{it} = \beta_0 + \beta_1 FirmT_i + \beta_2 WorkerT_i + \gamma_s + \alpha_t + \delta' X_i + \epsilon_{it} \quad (3)$$

$$Y_{it} = \beta_0 + \beta_1 FirmT_i + \beta_2 WorkerT_i + \beta_3 PeerT_i + \gamma_s + \alpha_t + \delta' X_i + \epsilon_{it} \quad (4)$$

$FirmT_i$ is a dummy indicating transfer to firm owner, $WorkerT_i$ is a dummy indicating transfer to worker,²⁰ $PeerT_i$ is a dummy indicating the peer-transfer group,²¹ γ_s are strata fixed effects, α_t are round fixed effects, and X_i are baseline controls. Baseline controls include any imbalanced covariates identified above, indicator variables for when those imbalanced covariates are missing, and additional baseline covariates (potentially) selected using a LASSO estimator and post-double selection procedure, which can vary with each outcome variable.²²

4 Results

4.1 Direct, Upstream, and Downstream Impacts of Cash Transfers

Our key experimental findings are summarized in Tables 1 and 2.²³ Both tables stack all five follow-up rounds, with the exception of Table 2 Column (6). We only observe that outcome variable in the fifth follow-up, collected in January of 2023 and referencing outcomes from December of 2022. Stacked across all five follow-up rounds, we see

²⁰Note that all specifications are reduced form. We are not estimating returns to capital by instrumenting for capital (whether at the firm or worker level) with our experimental treatment assignments because we are unlikely to satisfy the exclusion restriction.

²¹This group is quite small and therefore we do not focus on noisy estimates of β_3 resulting from the estimation. As a robustness check, we reproduce Table 2 dropping the peer-treated sample in Appendix Table A5. Point estimates are stable to this exclusion, though predictably less precise.

²²As a robustness check, we exclude baseline controls from our main results in Tables 1 and 2 in Appendix Tables A6 and A7. Point estimates are stable to this exclusion, though predictably less precise.

²³Appendix Table A8 reproduces Table 2 using owner-reported measures, with the exception of Column (6) as we only have a worker-report for this measure. Reassuringly, point estimates on owner-reports of worker outcomes are quite consistent with point estimates on worker-reports of worker outcomes. Note that sample sizes here differ from Table 2 due to slightly different individuals attriting from the owner and worker samples.

no impact of either treatment on firm survival (Table 1 Column (1)) or worker retention (Table 2 Column (1)). Still, we present results both unconditionally (Panels A) and conditional on firm survival and retention (Panels B).²⁴ In addition to no detectable effect on extensive margin labor supplied by the workers in our study to the firms in our study, we observe no intensive margin labor supply impacts for either firm owners or workers (Table 1 Column (7) and Table 2 Column (2)).

Consistent with prior studies (De Mel et al., 2008), firm owners invest a large share of their transfer in business assets (Table 1 Column (2)); firms treated with a transfer to the owner report higher business assets equivalent to about 60% of the amount of the transfer itself in Panel A. Unlike prior studies, firms in this sample increase hiring in response to the positive liquidity shock (Table 1 Column (3)), relative to their counterparts in the control group.²⁵ This finding on firm size is consistent with our exploration of industry heterogeneity in the existence of this organizational structure; firm owners in garment-making, cosmetology, and carpentry choose to add capital and labor in tandem with each other, suggesting a production function with high complementarities between labor and capital.

Table 2 Column (6) displays our findings on worker contributions to firm capital. The first thing to note is that absent intervention, contributions to capital are common in the control group. The mean in the control group among workers still at the firm is 218 GhC and 40% of control group workers contribute non-zero capital to the firm. The worker-transfer intervention more than doubles the contribution to capital, driven both by additional contributions from already contributing workers and additional workers contributing to capital.

The asset-holding value increase for workers in the worker-transfer group is mea-

²⁴Appendix Figures A1 and A2 show survival and retention results by round, where we observe survival effects in the final follow-up round and no retention effects in any round. Unconditional estimates replace missing data with zeros for firms that have been confirmed to have exited, for workers whose firms have been confirmed to have exited, and for workers confirmed to have exited survived firms. Missing data that results from not surveying a firm owner or worker in that round remains missing. Note that we do not impose that a firm exited in a certain round must remain exited in later rounds, as sometimes firms exit and reopen in this context.

²⁵Firm size and assets generally decreased over the period of follow-up surveys among firms in the control group, due to macroeconomic conditions. The positive point estimates on assets and firm size result from new asset purchases and new hires; where all firms experience regular decay of capital assets and attrition of employees, only firm-transfer firms replaced these with new asset purchases and new hires.

sured at about 35% of the total value of the cash transfer. Because we only collected this outcome in the fifth follow-up, we do not have a measure of worker-owned assets stacked across all five rounds that is comparable to the estimate for firm-owned assets in Table 1, Column (2). However, if we re-calculate estimates in Table 1 using only Round 5, among surviving firms, our point estimate on the firm-owned asset increase in the firm-transfer group is a noisy 274 GhC (Appendix Table A9). This number is quite close to our estimate of the worker-owned asset increases in the worker-transfer group (242 GhC) measured at the same time. We therefore conclude that, while we cannot test directly for differences in propensity to invest in trade-specific capital given data constraints, it is plausible that firms and workers have a similar propensity to invest and that point estimates on retained capital decay over the year of our study.

Upstream and direct firm-level production outcomes are summarized in Table 1 Columns (4), (5), and (6). Cash transfers yield increases in sales, profits, and gross profits (profits plus the wagebill, a measure of total surplus) in equal magnitude, regardless of the recipient of the cash transfer. All three outcomes are significantly different from the control group, both unconditionally and conditional on firm survival, and point estimates on the treatment effect are very similar for the two cash transfer treatments. A key conclusion from this experiment is thus that household- and individual-level cash transfer programs can yield spillover benefits to the productivity of the private sector that flow through this type of organizational structure in the labor market.

Downstream and direct worker-level production outcomes are summarized in Table 2 Columns (3), (4), and (5). *Worker sales* in Column (5) is our worker-reported measure of worker productivity, as discussed in Section 3.4. It suggests increases in worker productivity in equal magnitude (about 13%) resulting from both treatments. This finding is consistent with the firm-level findings in Table 1. Surplus division, however, does not have the same symmetry; workers only see wage increases in the worker-transfer group. Although workers in the worker-transfer group experience statistically significant increases in wages, it is still the case that the larger share of gross profit increases redound to profits; firms (and firm owners) capture the lion's share of the surplus.

We do not detect impacts on worker-transfer recipients starting their own businesses. One simple reason could be that the transfer amounts were too small to start a business in these industries. In addition, this finding might suggest that worker-firm relationships are sticky and highlight that firms function not only as places to bring together labor and capital but also as brands, buildings, customer-bases, organizational know-how, technical know-how, spaces for creative collaboration, and marketing operations.

4.2 Why Do Cash Transfers to Workers Increase Productivity?

Measured worker productivity, wages, and firm profits all rise in the worker-transfer group. Above we show that these productivity increases are unlikely to be driven by changes in hours worked in the reference firm. In this section we test for other labor-related potential explanations.

Worker productivity could rise in response to a liquidity shock if the worker herself is physically or mentally healthier (Kaur et al., 2021, Ghatak, 2015). We test for treatment effects on a PHQ2 measure of depression in Table 3 Column (1). We test for treatment effects on consumption spending on personal items, including notably food at food stalls, restaurants, and from outside food vendors, where wage employees may purchase lunch (Table 3 Column (2)). We detect no impact of the worker-transfer treatment on these measures of physical or mental well-being.

Worker productivity could be impacted by changes in the working life of the person outside the reference firm. For example, the purchased capital could increase or decrease moonlighting, yielding extra income and an income effect-like positive impact on productivity. Or the purchased capital could lead workers to invest less time in other income-generating pursuits, leaving them better rested for work at the reference firm. We find no impact of the worker-transfer treatment on income earned outside the firm nor on hours worked outside the firm (Table 3 Columns (3) and (4)), suggesting these explanations are unlikely to be driving our effects.

We also rule out firm-level changes in other sources of capital, finding no impact on capital rental expenses in Column (5) of Table 3. Though all estimates presented

in this paper are reduced form (rather than an instrumented estimate of returns to capital), our findings are most consistent with an explanation in which worker capital purchases drive productivity increases for workers, wage increases for workers, and profit increases at the firm-level.

5 Conclusion

This paper studies a previously unexplored organizational structure in which workers supply both labor and capital to small firms in low- and middle-income countries. Though our findings are specific to industries in which there are complementarities between labor and capital, these industries are central to understanding manufacturing and services firms in low- and middle-income countries. After documenting this organizational structure in a representative sample, we present results from a two-sided field experiment that randomized cash transfers to firm owners or a randomly selected worker in a sample of small employers. Transfer recipients of both types purchase trade-specific capital and firm production increases in equal magnitude in response to both treatments.

We interpret our results in the context of widespread capital constraints among both firms and individuals in low- and middle-income countries and the widespread use of cash transfer programs to both individuals and firms. The firm-transfer treatment we study is a partial replication of the seminal experiment studied in De Mel et al. (2008), with some similar conclusions. Importantly however, where workers supply both labor and capital, measures of firm asset-holdings could be underestimated, potentially impacting estimates of average or marginal returns to capital. The worker-transfer treatment we study is a partial replication of important work on household-level cash transfers, in which spillovers to the private sector have been interpreted through the lens of demand rather than investment (Egger et al., 2022). Here we show an additional mechanism through which markets can generate these kinds of spillovers in response to cash transfers.

Relatedly, our findings occur in a context in which cash transfer recipients have potentially limited investment opportunities. We would not, for example, expect cash

transfer recipients to invest a cash windfall in an index fund. Bernhardt et al. (2019) show that household-level investment opportunities matter for individual cash transfer recipients; self-employed women with self-employed husbands invest cash transfers in their husband's business rather than their own. The only productive investments self-reported by worker-transfer recipients in our data are trade-specific capital and education expenses, primarily for children in the household, with all other cash reported as used on personal and household consumption. From a market-level perspective, we might expect the organizational structure we study in this paper to be more prevalent in markets with both larger firm-level capital constraints and fewer individual-level investment opportunities. We leave exploration of this market-level heterogeneity to future work.

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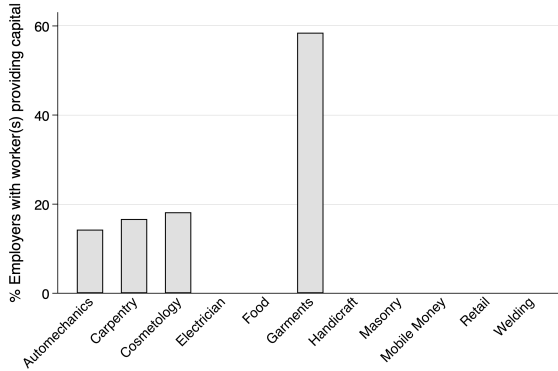
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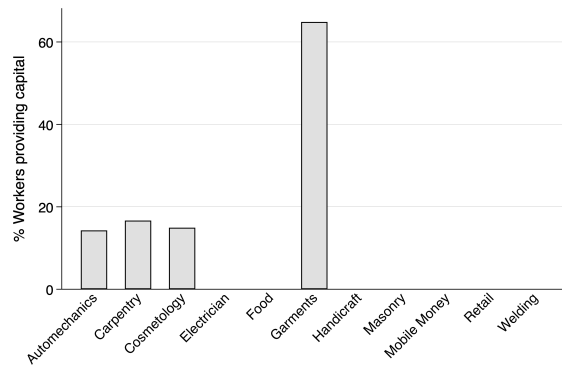
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Figure 1: Worker contribution of capital in Aburi, by industry

(a) Share of employers with worker capital



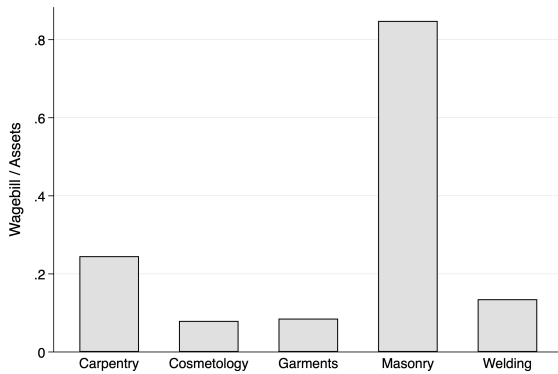
(b) Share of workers supplying capital



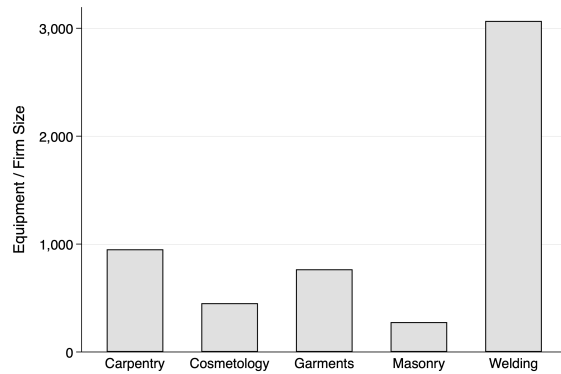
Notes: A sampled firm is considered “employer” if hiring at least one worker. An employer is considered having worker capital if at least one of the workers brings trade-specific capital. Panel (a) plots the share of employers that have worker capital within the trade. Panel (b) plots the share of workers that supply capital within the trade. Panel (a) and (b) are both based on data collected in June 2023.

Figure 2: Production characteristics of experimental sample, by industry

(a) Masonry is labor intensive



(b) Welding has lumpy equipment



Notes: Panel (a) shows the within-industry average value of the ratio of total wagebill over total firm assets. Panel (b) shows the within-industry average value of firm equipment and machinery per person, considering all workers supplying positive hours during the month and the owner. Panel (a) and (b) are both based on baseline data (November 2021).

Table 1: Firm treatment effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Survival	Assets (win)	Size	Sales (win)	Gross Profits (win)	Profit (win)	Owner hours
Panel A: Unconditional							
Transfer to Owner	0.0131 (0.00807)	416.0** (210.6)	0.522*** (0.178)	150.8** (70.43)	95.70** (42.92)	67.96** (30.88)	0.161 (0.868)
Transfer to Worker	0.00953 (0.00856)	-52.69 (198.6)	0.182 (0.167)	158.0** (69.83)	93.67** (40.91)	77.61** (33.36)	0.0546 (0.950)
Observations	1706	1706	1706	1705	1705	1705	1706
Mean (Control)	0.97	3846.07	4.07	1129.43	763.05	506.17	49.62
Prob > F	0.65	0.04	0.06	0.93	0.96	0.77	0.91
Panel B: Conditional on firm survival							
Transfer to Owner		362.7* (207.7)	0.491*** (0.178)	135.8* (70.08)	90.55** (41.30)	64.67** (30.28)	-0.615 (0.725)
Transfer to Worker		-95.94 (197.9)	0.152 (0.167)	150.6** (69.93)	98.23** (39.70)	72.98** (33.10)	-0.434 (0.798)
Observations		1671	1671	1670	1670	1670	1671
Mean (Control)		3954.41	4.18	1161.30	784.59	520.46	51.02
Prob > F		0.04	0.06	0.84	0.86	0.80	0.81

Notes: Panel A is unconditional on firm survival; every non-atritted owner response is included. Panel B is conditional on firm survival. Regressions include round fixed effects, strata fixed effects, imbalanced baseline control variables and PDSLASSO selected baseline control variables. The top 1% of assets, sales, gross profits and profits are winsorized, and deflated to Ghana Cedi values in October 2021. Size includes total number of workers and the owner. Gross Profits is the sum of firm profit and total wage bill. Owner hours is the number of hours that owner worked for the reference firm in a typical week in the corresponding month. Standard errors in parentheses are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Worker treatment effects

	(1)	(2)	(3)	(4)	(5)	(6)
	Retention	Worker hours	Wage	Wages (8h)	Worker sales	Worker Assets
Panel A: Unconditional						
Transfer to Owner	0.00424 (0.0227)	0.135 (1.339)	5.019 (7.335)	0.190 (0.393)	41.56* (22.20)	72.15 (48.93)
Transfer to Worker	0.00886 (0.0259)	0.722 (1.491)	12.86* (7.161)	0.706 (0.430)	40.12* (22.61)	170.0*** (59.83)
Observations	2663	2663	2663	2663	2662	523
Mean (Control)	0.86	43.85	84.86	4.08	294.03	156.96
Prob > F	0.86	0.69	0.34	0.31	0.95	0.12
Panel B: Conditional on working at survived firm						
Transfer to Owner		-0.276 (0.772)	1.763 (8.136)	0.0925 (0.464)	40.17* (21.14)	99.82 (67.11)
Transfer to Worker		-0.0671 (0.810)	13.48* (7.992)	0.793* (0.479)	42.59* (21.75)	242.4*** (74.99)
Observations		2277	2277	2277	2276	372
Mean (Control)		51.01	98.80	4.75	341.83	218.57
Prob > F		0.80	0.17	0.20	0.91	0.09

Notes: Panel A is unconditional on worker retention or survival; every non-atritted worker response is included. Panel B is conditional on workers-reported retention, and firm survival. Regressions include round fixed effects, strata fixed effects, imbalanced baseline control variables and PDSLASSO selected baseline control variables. Retention equals one if worker reports providing positive number of hours of labor to the reference firm. Worker hours is number of hours that the worker worked for the reference firm in a typical week of the corresponding month. Worker hours, wages and worker sales are reported by workers. Wages, worker sales and worker assets are deflated to Ghana Cedi values in October 2021. Wage (8h) is the estimated daily wage for an 8-hour working day. Worker assets are only measured in December 2022, which equals the value of the capital that workers can keep in event of quitting from the reference firm. Worker sales is the worker-reported value of firm sales contributed by the worker. Standard errors in parentheses are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Alternative channels of productivity increase

	(1)	(2)	(3)	(4)	(5)
	Depressed	Consumption	Other income	Other hours	Capital expense
Panel A: Unconditional					
Transfer to Owner	-0.0228*	-6.406	11.90	-0.151	3.581
	(0.0132)	(13.72)	(8.647)	(0.365)	(3.200)
Transfer to Worker	0.00367	-2.744	4.214	0.258	4.677
	(0.0178)	(15.79)	(10.45)	(0.428)	(3.311)
Observations	2662	2662	2663	2663	1706
Mean (Control)	0.07	225.12	12.60	1.32	15.28
Prob > F	0.08	0.79	0.55	0.30	0.74
Panel B: Conditional on working at survived firm					
Transfer to Owner	-0.0276*	-13.82	13.39	-0.182	3.565
	(0.0151)	(15.54)	(9.994)	(0.436)	(3.272)
Transfer to Worker	0.000144	-13.18	4.537	0.280	4.640
	(0.0204)	(16.19)	(12.04)	(0.477)	(3.390)
Observations	2276	2276	2277	2277	1671
Mean (Control)	0.07	261.91	14.81	1.55	15.71
Prob > F	0.11	0.97	0.55	0.32	0.75

Notes: Depressed is a dummy variable indicating likely major depressive disorder according to the PHQ-2 score of workers. Consumption is the total amount of spending by workers on dining outside of household, personal items (clothes, jewellery, etc.), and personal phone credit in the corresponding month. Other income includes wages from other employment, profits from other self-employed businesses, and farming income of workers; it does not include income from side jobs. Other hours include number of hours spent on other income sources in a normal week. Capital expense is spending on capital rental of the reference firm. Depressed, consumption, other income and other hours are reported by workers, while capital expense is reported by the firm owner. Consumption, other income and capital expense are all deflated to Ghana Cedi values in October 2021. Standard errors in parentheses are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

A Online Appendix

Table A1: Summary Statistics of Firms in Aburi, with selected industries

	All		Automechanics	Carpentry	Cosmetology	Garments	Masonry	Retail	Welding
	Mean	SD							
Firm size	1.3	(0.9)	2.3	1.9	1.4	1.4	2.0	1.1	2.1
Assets (win)	7,203.0	(15,934.4)	10,670.4	25,816.2	7,068.8	7,777.0	8,412.5	5,133.2	11,626.7
Sales (win)	3,382.4	(5,093.8)	6,959.2	6,425.9	1,555.4	1,555.6	3,370.0	3,177.1	7,045.2
Profits (win)	743.7	(934.1)	1,576.5	1,841.4	581.4	614.1	1,258.1	623.4	1,315.2
Wagebill (win)	58.8	(220.1)	236.9	155.2	42.1	15.6	417.2	26.8	192.9
Female manager (%)	82.8	(37.7)	3.8	3.4	89.9	80.1	15.6	92.3	0.0
Co-owned (%)	1.0	(9.9)	0.0	3.4	1.3	3.6	0.0	0.4	4.8
Tenure (yrs)	10.5	(9.3)	14.7	15.1	8.8	12.2	15.1	9.1	12.4
Visible (%)	38.4	(48.6)	80.8	65.5	58.9	38.6	21.9	28.7	76.2
Gov. registered (%)	29.4	(45.6)	46.2	31.0	44.9	32.5	21.9	19.9	38.1
With worker (%)	13.1	(33.7)	69.2	20.7	20.9	19.1	40.6	5.6	42.9
N	1,550		22	21	106	141	12	606	17

Notes: Sampling statistic estimates are adjusted using sampling weights to represent the universe of firms in Aburi. Besides government registration status which is as of May 2022, all other values are measured in May 2023. Firm size is the number of workers and (co-)owner(s). Assets are measured as resale values of inventory, tools, equipment and other assets as of the month-end. Top 1% of assets, sales, profits, wagebills are winsorized. With worker (%) is the share of firms that have at least one worker among all identified firms. Industries omitted from the table are Electrician, Food, Handicraft, and Mobile Money.

Table A2: Attrition in Follow-up Rounds

	(1)	(2)
	Attrited owners	Attrited workers
Transfer to Owner	-0.0120 (0.0145)	0.00313 (0.0113)
Transfer to Worker	0.0184 (0.0192)	-0.00333 (0.0127)
Observations	1780	2695
Mean (Control)	0.02	0.02
Prob > F	0.07	0.63

Notes: Regressions are based on a balanced panel of 356 firms (Column (1)) or 539 workers (Column (2)), and 5 rounds. Attrition equals one if the respondent is not reachable, deceased, or refused to participate in the survey. Regressions include round fixed effects and strata fixed effects. Regressions in Column (2) include a dummy for the peer-treated sample, mirroring our main specification.

Table A3: Baseline Summary Statistics and Balance - Firm Outcomes

	All	Control	Transfer to Owner		Transfer to Worker		Owner - Worker		N
	mean	mean	diff (Control)	(diff=0) p-val	diff (Control)	(diff=0) p-val	diff	(diff=0) p-val	
Female owner	0.72								
Garments	0.51								
Carpentry	0.17								
Greater Accra region	0.07								
One eligible worker	0.49								
Assets (win)	4795.25	5223.60	138.46	(0.88)	-1260.09	(0.11)	1398.55*	(0.09)	356
Debt (win)	247.54	299.12	-35.31	(0.78)	-126.71	(0.23)	91.39	(0.37)	356
Sales (win)	1267.82	1228.75	113.31	(0.50)	-22.16	(0.88)	135.47	(0.45)	356
Profit (win)	516.01	529.67	-23.15	(0.73)	-33.61	(0.61)	10.46	(0.87)	356
Wagebill (win)	389.71	356.04	63.47	(0.37)	46.32	(0.53)	17.15	(0.85)	356
Num. workers	4.00	4.19	-0.54*	(0.08)	-0.12	(0.70)	-0.42	(0.19)	356
Firm tenure	18.84	18.36	0.66	(0.47)	0.68	(0.45)	-0.02	(0.98)	343
Owner hours	49.38	50.34	-1.27	(0.36)	-1.30	(0.42)	0.03	(0.99)	356
Age	42.95	42.27	0.99	(0.30)	0.88	(0.34)	0.11	(0.91)	342
Married	0.85	0.82	0.02	(0.62)	0.06	(0.15)	-0.04	(0.35)	356
Live with partner	0.82	0.79	0.02	(0.66)	0.05	(0.27)	-0.03	(0.50)	356
Num. adults	3.42	3.50	-0.27	(0.25)	0.04	(0.88)	-0.31	(0.20)	356
Num. children	2.38	2.46	-0.20	(0.34)	-0.03	(0.90)	-0.17	(0.34)	356
Num. self-employed adults	0.73	0.74	-0.01	(0.96)	-0.05	(0.70)	0.04	(0.77)	356
Num. no-income adults	0.75	0.72	0.00	(1.00)	0.08	(0.62)	-0.08	(0.61)	356
Other income (win)	60.73	57.92	2.43	(0.93)	7.83	(0.75)	-5.41	(0.87)	355
Phone spending	25.26	26.04	-1.04	(0.74)	-2.10	(0.45)	1.06	(0.68)	356
Go out spending	30.85	26.04	3.85	(0.52)	8.76	(0.13)	-4.91	(0.48)	356
Bad meals	0.80	0.68	0.22	(0.22)	0.16	(0.35)	0.06	(0.74)	356
Satisfaction	6.72	6.71	-0.04	(0.84)	0.06	(0.74)	-0.09	(0.60)	356
Owner productivity	46.40	45.32	2.37	(0.19)	0.51	(0.79)	1.86	(0.37)	356
Other workers productivity	15.51	16.65	-2.43	(0.16)	-1.01	(0.57)	-1.43	(0.44)	356
Risk averse	0.51	0.52	0.04	(0.55)	-0.04	(0.54)	0.08	(0.22)	356
F-test of joint sig. (p-value)				(0.68)		(0.31)		(0.75)	

Notes: Each coefficient is from a separate regression of baseline owner-level covariates on treatment assignments and strata fixed effects. Top 1% of wagebill, sales, profits, assets and debt are winsorized and deflated to October 2021 level. The top portion of the table reports characteristics used to stratify the randomization, by three industries, firm owner gender, whether the firm had one or more eligible workers, and whether the firm was in Greater Accra Region or another Region of Ghana. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A4: Baseline Summary Statistics and Balance - Worker Outcomes

	All	Control	Transfer to Owner		Transfer to Worker		Owner - Worker		N
	mean	mean	diff	(diff=0) p-val	diff	(diff=0) p-val	diff	(diff=0) p-val	
OWNER-REPORTED									
Worker hours	47.14	46.93	0.04	(0.98)	0.32	(0.80)	-0.28	(0.82)	539
Assets (win)	5010.59	5690.52	-308.40	(0.76)	-1504.09*	(0.09)	1195.69	(0.13)	539
Num. workers	4.41	4.58	-0.60*	(0.09)	-0.10	(0.76)	-0.50	(0.14)	539
Finished apprentice	0.12	0.12	0.01	(0.75)	0.03	(0.40)	-0.02	(0.65)	539
Worker Tenure	2.71	2.62	-0.10	(0.69)	0.25	(0.45)	-0.35	(0.30)	539
WORKER-REPORTED									
Wage	98.34	102.45	-3.72	(0.82)	-3.04	(0.88)	-0.68	(0.97)	536
Female	0.77	0.75	0.03	(0.19)	0.04*	(0.06)	-0.01	(0.63)	539
Age	24.75	25.07	-0.37	(0.63)	-0.09	(0.91)	-0.28	(0.70)	539
Married	0.25	0.24	0.03	(0.58)	0.04	(0.44)	-0.01	(0.81)	539
Live with partner	0.24	0.24	0.01	(0.82)	0.02	(0.62)	-0.01	(0.78)	539
Num. adults	3.01	3.02	-0.12	(0.60)	-0.03	(0.91)	-0.09	(0.68)	539
Num. children	1.55	1.67	-0.18	(0.34)	-0.09	(0.69)	-0.10	(0.64)	539
Num. self-employed adults	0.70	0.73	-0.05	(0.69)	-0.02	(0.88)	-0.03	(0.82)	539
Num. no-income adults	0.83	0.81	-0.10	(0.49)	0.02	(0.91)	-0.12	(0.43)	539
Personal spending	23.54	22.41	1.03	(0.81)	-0.77	(0.84)	1.80	(0.71)	539
Risk averse	0.65	0.65	-0.03	(0.67)	-0.00	(0.95)	-0.02	(0.72)	539
Owner's family	0.05	0.07	-0.03	(0.14)	-0.03	(0.26)	-0.00	(0.87)	539
Previously unknown to owner	0.33	0.34	0.01	(0.91)	-0.03	(0.61)	0.04	(0.53)	539
Depressed	0.18	0.15	0.03	(0.39)	0.05	(0.29)	-0.01	(0.78)	538
Farming	0.04	0.02	0.03*	(0.10)	0.07**	(0.01)	-0.03	(0.20)	539
F-test of joint sig. (p-value)			(0.52)		(0.11)		(0.83)		

Notes: Each coefficient is from a separate regression of baseline worker-level covariates on treatment assignments and strata fixed effects. Top 1% of wage and assets are winsorized. Values of assets, wages, and total income are deflated to October 2021 level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A5: Worker Treatment Effect Excluding the Peer-Treated Sample

	(1)	(2)	(3)	(4)	(5)	(6)
	Retention	Worker hours	Wage	Wages (8h)	Worker sales	Worker assets
Panel A: Unconditional						
Transfer to Owner	0.00525 (0.0228)	0.139 (1.333)	3.236 (7.270)	0.201 (0.394)	43.09* (22.22)	69.14 (48.48)
Transfer to Worker	0.00915 (0.0260)	0.765 (1.484)	11.06 (7.186)	0.706* (0.428)	40.78* (22.51)	169.2*** (59.82)
Observations	2367	2367	2367	2367	2366	467
Mean (Control)	0.86	43.85	84.86	4.08	294.03	156.96
Prob > F	0.88	0.67	0.35	0.32	0.92	0.11
Panel B: Conditional on working at survived firm						
Transfer to Owner		-0.290 (0.772)	1.876 (8.156)	0.0985 (0.465)	41.88** (21.12)	107.6* (64.39)
Transfer to Worker		-0.0618 (0.813)	13.16 (8.003)	0.773 (0.478)	43.33** (21.60)	233.7*** (74.01)
Observations		2022	2022	2022	2021	333
Mean (Control)		51.01	98.80	4.75	341.83	218.57
Prob > F		0.79	0.19	0.22	0.95	0.12

Notes: Peer-treated worker responses are dropped for all regressions. Panel A is unconditional on worker retention or survival; every non-attrited worker response is included. Panel B is conditional on workers-reported retention, and firm survival. Regressions include round fixed effects, strata fixed effects, imbalanced baseline control variables and PDSLASSO selected baseline control variables. Retention equals one if worker reports providing positive number of hours of labor to the reference firm. Worker hours is number of hours that the worker worked for the reference firm in a typical week of the corresponding month. Worker hours, wages and worker sales are reported by workers. Wages, worker sales and worker assets are deflated to Ghana Cedi values in October 2021. Wage (8h) is the estimated daily wage for an 8-hour working day. Worker assets are only measured in December 2022, which equals the value of the capital that workers can keep in event of quitting from the reference firm. Worker sales is the worker-reported value of firm sales contributed by the worker. Standard errors in parentheses are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A6: Firm Treatment Effects Excluding Baseline Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Survival	Assets (win)	Size	Sales (win)	Gross Profits (win)	Profit (win)	Owner hours
Panel A: Unconditional							
Transfer to Owner	0.0116 (0.00820)	250.5 (233.4)	0.227 (0.220)	157.4* (81.57)	70.63 (48.29)	58.67* (33.83)	-0.563 (0.981)
Transfer to Worker	0.00826 (0.00864)	-231.9 (226.8)	0.0791 (0.211)	135.3 (85.46)	70.31 (49.35)	65.82* (37.53)	0.125 (1.019)
Observations	1706	1706	1706	1705	1705	1705	1706
Mean (Control)	0.97	3846.07	4.07	1129.43	763.05	506.17	49.62
Prob > F	0.67	0.05	0.51	0.80	0.99	0.85	0.51
Panel B: Conditional on firm survival							
Transfer to Owner		202.9 (230.6)	0.199 (0.220)	144.1* (81.39)	61.70 (48.25)	52.79 (34.09)	-1.203 (0.855)
Transfer to Worker		-276.0 (226.5)	0.0534 (0.212)	124.4 (85.77)	63.24 (49.46)	61.45 (38.04)	-0.332 (0.884)
Observations		1671	1671	1670	1670	1670	1671
Mean (Control)		3954.41	4.18	1161.30	784.59	520.46	51.02
Prob > F		0.05	0.51	0.82	0.98	0.82	0.34

Notes: Panel A is unconditional on firm survival; every non-attrited owner response is included. Panel B is conditional on firm survival. Regressions include round fixed effects and strata fixed effects. The top 1% of assets, sales, gross profits and profits are winsorized, and deflated to Ghana Cedi values in October 2021. Size includes total number of workers and the owner. Gross Profits is the sum of firm profit and total wage bill. Owner hours is the number of hours that owner worked for the reference firm in a typical week in the corresponding month. Standard errors in parentheses are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A7: Worker Treatment Effects Excluding Baseline Controls

	(1)	(2)	(3)	(4)	(5)	(6)
	Retention	Worker hours	Wage	Wages (8h)	Worker sales	Worker assets
Panel A: Unconditional						
Transfer to Owner	0.00284 (0.0241)	-0.967 (1.684)	1.824 (9.153)	0.266 (0.522)	31.17 (22.68)	60.24 (51.96)
Transfer to Worker	0.0118 (0.0271)	0.179 (1.732)	11.41 (9.954)	0.836 (0.568)	37.99 (24.05)	163.4** (65.45)
Observations	2663	2663	2663	2663	2662	523
Mean (Control)	0.86	43.85	84.86	4.08	294.03	156.96
Prob > F	0.74	0.50	0.38	0.37	0.79	0.11
Panel B: Conditional on working at survived firm						
Transfer to Owner		-1.316 (1.096)	1.154 (10.51)	0.252 (0.618)	32.42 (21.97)	81.96 (69.92)
Transfer to Worker		-0.431 (1.058)	13.87 (11.34)	0.977 (0.658)	38.37* (22.73)	236.1*** (81.49)
Observations		2277	2277	2277	2276	372
Mean (Control)		51.01	98.80	4.75	341.83	218.57
Prob > F		0.42	0.30	0.33	0.80	0.07

Notes: Panel A is unconditional on worker retention or survival; every non-attrited worker response is included. Panel B is conditional on workers-reported retention, and firm survival. Regressions include round fixed effects and strata fixed effects. Retention equals one if worker reports providing positive number of hours of labor to the reference firm. Worker hours is number of hours that the worker worked for the reference firm in a typical week of the corresponding month. Worker hours, wages and worker sales are reported by workers. Wages, worker sales and worker assets are deflated to Ghana Cedi values in October 2021. Wage (8h) is the estimated daily wage for an 8-hour working day. Worker assets are only measured in December 2022, which equals the value of the capital that workers can keep in event of quitting from the reference firm. Worker sales is the worker-reported value of firm sales contributed by the worker. Standard errors in parentheses are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A8: Worker Treatment Effects Based on Owner-Reported Measures

	(1)	(2)	(3)	(4)	(5)
	Retention	Worker hours	Wage	Wages (8h)	Worker sales
Panel A: Unconditional					
Transfer to Owner	0.00661 (0.0264)	-0.246 (1.598)	-0.0486 (7.657)	0.0895 (0.420)	30.29 (21.84)
Transfer to Worker	-0.00675 (0.0305)	-0.449 (1.723)	15.96** (7.798)	1.033** (0.451)	23.42 (19.99)
Observations	2522	2522	2522	2518	2520
Mean (Control)	0.86	42.96	88.34	4.27	222.09
Prob > F	0.65	0.91	0.04	0.05	0.73
Panel B: Conditional on working at survived firm					
Transfer to Owner		-0.434 (0.843)	-2.785 (8.008)	-0.0745 (0.458)	25.79 (22.95)
Transfer to Worker		0.278 (0.901)	15.96** (7.923)	1.140** (0.478)	36.05* (20.45)
Observations		2175	2175	2171	2173
Mean (Control)		49.84	102.49	4.96	257.74
Prob > F		0.40	0.02	0.02	0.62

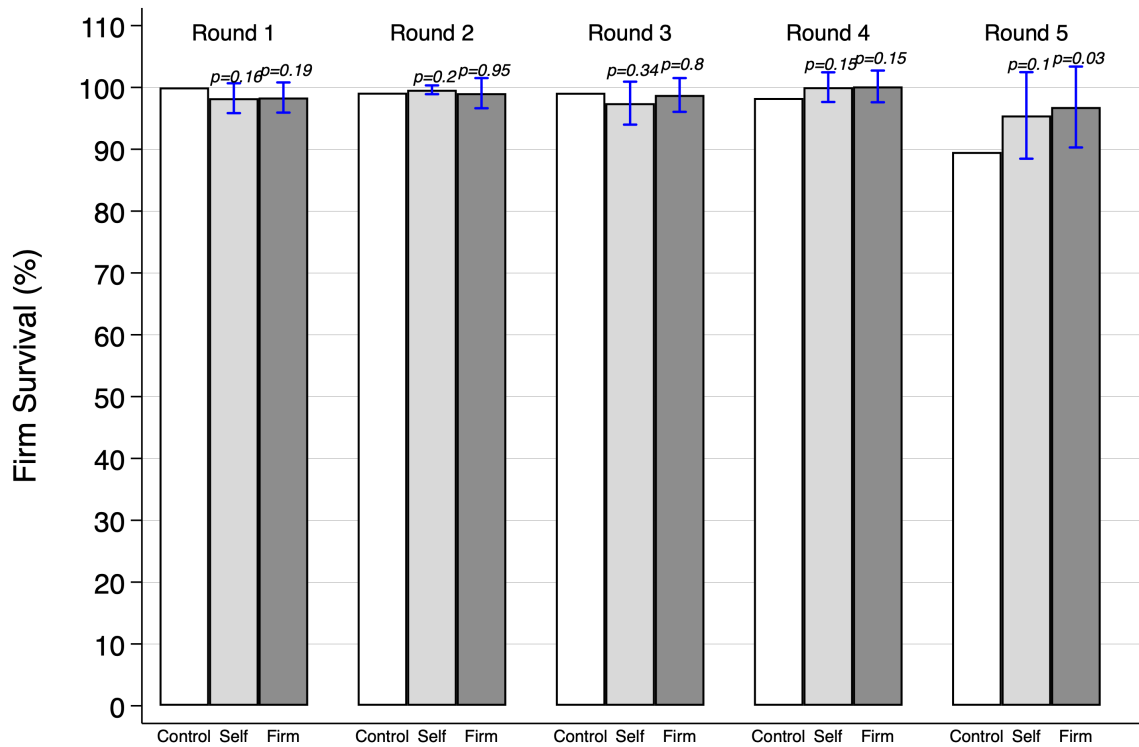
Notes: Panel A is unconditional on owners-reported worker retention or survival; every non-attrited worker response is included. Panel B is conditional on owners-reported retention, and firm survival. Regressions include round fixed effects, strata fixed effects, imbalanced baseline control variables and PDSLASSO selected baseline control variables. Retention equals one if owners report the respective worker provided positive number of hours of labor to the reference firm. Worker hours is number of hours that the worker worked for the reference firm in a typical week of the corresponding month. Wage (8h) is the estimated daily wage for an 8-hour working day. Worker assets are only measured in December 2022, which equals the value of the capital that workers can keep in event of quitting from the reference firm. Worker sales is the owner-reported relative share of sales contributed by the reference worker multiplying value of firm sales. Worker hours, wages and worker sales are reported by firm owners. Wages and worker sales are deflated to Ghana Cedi values in October 2021. Standard errors in parentheses are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A9: Firm treatment effects in December 2022

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Survival	Assets (win)	Size	Sales (win)	Gross Profits (win)	Profit (win)	Owner hours
Panel A: Unconditional							
Transfer to Owner	0.0726** (0.0332)	540.0* (292.1)	1.136*** (0.304)	449.3*** (121.7)	231.1*** (74.82)	181.6*** (56.79)	3.183 (2.203)
Transfer to Worker	0.0590* (0.0355)	288.1 (286.0)	0.367 (0.290)	344.4*** (101.6)	220.4*** (78.28)	183.7*** (59.91)	3.246 (2.284)
Observations	333	333	333	333	333	333	333
Mean (Control)	0.90	3675.30	3.28	1065.11	689.08	492.63	47.57
Prob > F	0.61	0.38	0.02	0.37	0.89	0.97	0.97
Panel B: Conditional on firm survival							
Transfer to Owner	0.0726** (0.0332)	274.2 (274.3)	0.930*** (0.299)	400.0*** (124.1)	175.0** (72.57)	138.6** (55.08)	-0.526 (1.408)
Transfer to Worker	0.0590* (0.0355)	69.52 (274.5)	0.182 (0.283)	303.8*** (99.57)	176.6** (77.62)	155.5*** (60.36)	0.118 (1.404)
Observations	333	312	312	312	312	312	312
Mean (Control)	0.90	4103.49	3.66	1189.20	769.36	550.02	53.11
Prob > F	0.61	0.46	0.02	0.42	0.98	0.78	0.64

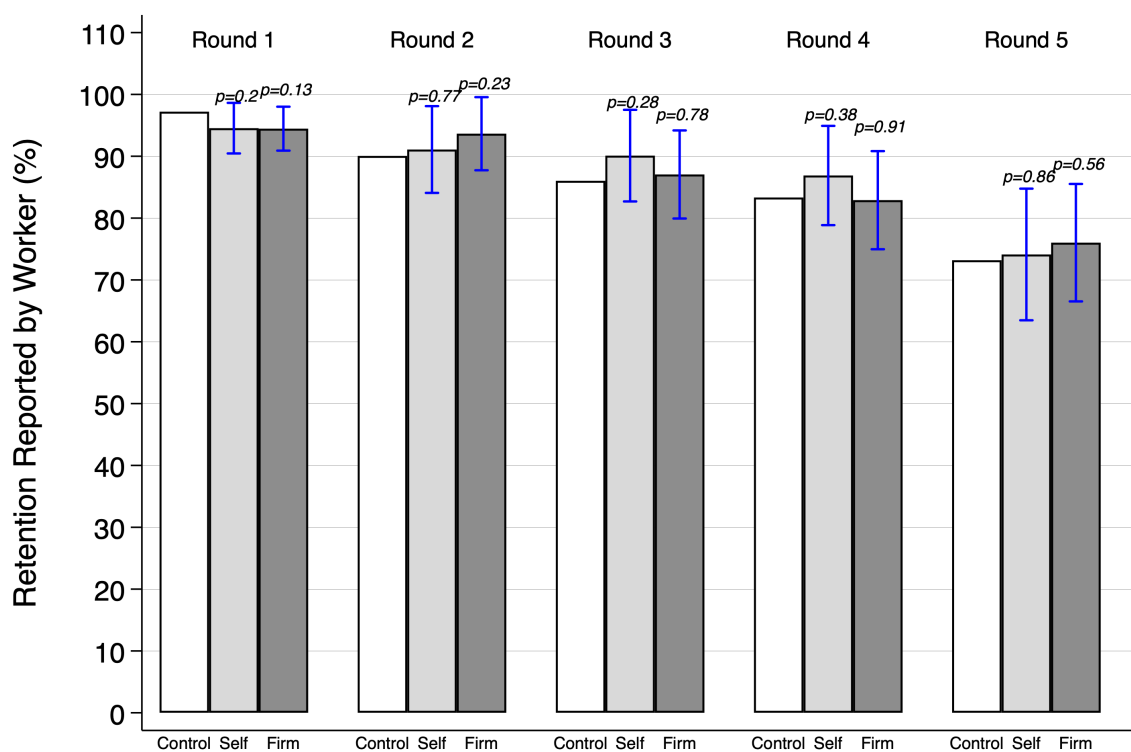
Notes: Panel A is unconditional on firm survival; every non-attributed owner response is included. Panel B is conditional on firm survival. Regressions include strata fixed effects, imbalanced baseline control variables and PDSLASSO selected baseline control variables. The top 1% of assets, sales, gross profits and profits are winsorized, and deflated to Ghana Cedi values in October 2021. Size includes total number of workers and the owner. Gross Profits is the sum of firm profit and total wage bill. Owner hours is the number of hours that owner worked for the reference firm in a typical week in the corresponding month. Standard errors in parentheses are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure A1: Firm survival by round



Notes: Here we present firm survival across treatment groups. White histogram bars list the raw means of control group; grey bars represent levels equal to the control mean plus the corresponding treatment effect estimated from our main specification, including imbalanced baseline covariates, strata fixed effects, and LASSO-selected additional controls where applicable. Confidence intervals and p-values also come from regressions that mirror the main specification.

Figure A2: Worker retention by round



Notes: Here we present worker retention across treatment groups. White histogram bars list the raw means of control group; grey bars represent levels equal to the control mean plus the corresponding treatment effect estimated from our main specification, including imbalanced baseline covariates, strata fixed effects, and LASSO-selected additional controls where applicable. Confidence intervals and p-values also come from regressions that mirror the main specification.