

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

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Abstract

We document capital contributions from workers to their employers in a representative sample of small firms. We separately conduct a two-sided experiment in a sample of small employers, randomizing cash transfers to firm owners or a randomly selected worker. 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 and experience wage increases. Our findings challenge the assumption of a separation of labor and capital in firms, with widespread implications for measurement and for understanding the nature of firms in our context.

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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.¹

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, where workers contribute capital such as sewing machines, hair dryers, and wood planers respectively. Focusing on firm-worker pairs 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.² 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 owned 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 beneficiary

¹The modal worker in our sample and across small firms in West Africa is an apprentice. Apprenticeship in West Africa is a longstanding informal institution with a suite of commonly understood nominal contract structures; one of these is that apprentices should come to their apprenticeship with trade-specific capital. However, in our experience in the field and in our census data only about half of apprentices own any trade-specific capital. In addition, apprentice asset ownership does not increase with apprentice tenure (see Appendix Figure A1), suggesting asset contributions are in practice not required either for apprenticeship entry or completion. Although apprenticeships are quite important to understanding labor markets in this context, the phenomenon we describe in this paper is not tautological, because in practice apprenticeship employment is not conditional on workers providing their own equipment.

²Splitting workers in the worker transfer group into apprentices and non-apprentices, 52% of apprentices report purchasing some trade-specific capital and 55% of non-apprentices report purchasing trade specific capital.

of the transfer. While firm-owner reported (and owned) assets 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.

Both treatments increase worker productivity, and these increases are of very similar magnitude.³ Worker productivity could be responding to changes in intensive margin labor supply at the firm, or changes in labor supply or income generated from outside the firm. The worker-transfer liquidity shock could also generate worker productivity changes if the liquidity itself makes the worker physically or mentally healthier (Kaur et al., 2021, Ghatak, 2015). We find no evidence of changes in labor supply at the firm or elsewhere and no changes in outside income from either treatment. We find no evidence of changes in worker mental well-being (measured using the PHQ-2 measure of depression) and no changes in food consumption related to the worker-transfer liquidity shock. We conclude that our evidence is most consistent with capital-access-driven increases in worker productivity (in both treatment groups), which generate increases in firm-level sales and profits (and upstream benefits for firms in the worker-transfer group).

Third, workers in the worker-transfer group experience wage increases, while reference workers in the firm-transfer group do not. This finding suggests limited downstream benefits of firm transfers for the incumbent workforce, despite similar increases in measured worker productivity, firm sales, and firm profits. Instead, firms in the firm-transfer group hire new workers, increasing their overall firm size. We thus find no evidence that cash transfers to firm owners are subject to sharing pressure with

³We collect novel measures of worker-productivity from both workers and firms. The worker-reported measure asks workers to estimate the value of firm sales generated by their efforts. Bassi et al. (2023) suggest workers in small-scale manufacturing and services frequently produce items from start to finish rather than specializing in one phase of production, which would imply this measurement strategy could be quite precise. Conditional on retention, we show that both treatments increase this worker-reported measure of productivity at the firm by about 12%. The owner-reported measure asks owners to apportion sales across themselves and all workers, in percentage terms, predictably yielding smaller (and marginally insignificant) estimates of the contribution to sales for workers, as owners tend to believe their own work is the primary contributor to firm sales.

existing workers, which was a priori an empirical question.⁴ These findings are, however, consistent with a broader redistributive pressure that takes the form of hiring new novice workers, and with recent evidence from Uganda about the role of employment in redistribution (Macchi and Stalder, 2023).

Firms in the firm-transfer group experience an exogenous productivity shock (in the form of additional capital) and an increase in firm size, allowing for a relatively clean test of whether firms in this context face an upward-sloping labor supply curve. A growing literature from around the world (from mostly larger firms) has found that wages respond to firm-specific demand or productivity shocks. Amodio and De Roux (2023), Card et al. (2016) and Kline et al. (2019) show evidence that firms face an upward-sloping labor supply curve. Carvalho et al. (2023) present a nice example of demand shocks yielding wage increases without firm size effects (which they argue is direct evidence of bargaining). Our evidence is inconsistent with either explanation for the workers in the firm-transfer group.

We carefully measure capital rental payments separately from wages, ruling out that our wage measure is capturing a simple capital rental payment from firm owner to worker. Instead, we present evidence that the wage increases for workers in the worker-transfer group may be driven by changes in the payment contract generated by workers providing both labor and capital. Workers who receive cash transfers are 19 percentage points (29%) more likely to report firm sales as a top three determinant of their wages and 14 percentage points (56%) less likely to report tenure at the firm or job title as a top three determinant of their wages. This evidence suggests a movement towards more revenue sharing for workers in the worker-transfer group. We estimate an implied return on investment for workers of about 6% monthly, akin to returns to capital among one-person firms in the literature (De Mel et al., 2008). Still, the majority of the surplus generated by worker capital is captured in profits, the take-home pay of the firm owner.

Although an established literature has examined organizational structure of (large)

⁴See 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 financial responsibility of firm owners.

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.⁵ 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.

An important implication of our work is that it challenges an assumed separation between labor and capital in non-agricultural firms. Rethinking the deep nature of the firm in these settings can be consequential for measurement. For example, consider recent work by Amodio et al. (2024) which estimates wage markdowns (the ratio between the marginal revenue product of labor and wages) across countries and finds that in Sub-Saharan Africa a relatively large share of firms have negative wage markdowns (meaning workers are earning *more* than their marginal revenue product of labor). One way to interpret that finding is through the lens of this paper, where wages in some instances capture not only labor compensation, but compensation for the joint contribution of both labor and capital. To the extent that what we document here is prevalent in these types of firms across Sub-Saharan Africa, there are measurement implications for wages and returns to capital within a large body of work that studies labor markets and firms on the continent.

⁵An 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 document in this section the existence of the organizational structure we study. Specifically, we show 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).⁶ This listing identified 1,600 firm owners.⁷ In June 2023, our survey team collected a worker roster of all individuals contributing positive labor inputs to the 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.⁸ The worker roster identified 272 employers and 555 workers.⁹

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

⁶This 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.

⁷Sample inclusion required that the firm owner had an operational business as of May 2022 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.

⁸Note 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.

⁹See 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.¹⁰ The sample is drawn from 32 districts around Ghana, designed to generate representation across rural and urban areas, and across all regions of Ghana.¹¹ 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 2020.¹²

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.¹³ 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

¹⁰These 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. In 2020, we reached 88% of the original sample by phone. Of those we spoke to by phone, 93% were still in business as of February 2020; Of these, 95% had reopened after the COVID shutdowns by July 2020. Taken together, 88% of the firms we were able to reach by phone form the basis of the worker roster from which we generate our experimental sample, suggesting the representativeness of the sample documented in (Hardy and McCasland, 2023) is largely preserved.

¹¹The 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).

¹²In 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).

¹³See Appendix Tables A9, A10, A11 and A12 for balance checks and experimental findings for the dropped 82 firms in masonry and welding. Given the quite small sample, covariates are imbalanced across treatment groups for both firms and workers, and point estimates are extremely noisy. Relative to the analysis sample, we highlight two key differences. First, in masonry and welding, the firm transfer has a statistically larger impact on sales and profits than the worker transfer (the point estimates on firm transfer are positive and comparable to the point estimates in our main experimental sample; the point estimates on worker transfer are negative). Second, we find no evidence that transfers to workers in these trades generate increases in worker ownership of trade-specific capital assets used in the employing firm (point estimates are negative or very near zero).

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. With respect to the experiment, most welding machinery costs exceed the size of the cash transfer, meaning the transfer itself cannot fully overcome liquidity constraints for this trade. 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 the main analysis in this paper.¹⁴

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. 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.¹⁵ Both 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.

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 ex-

¹⁴We pre-registered a fairly austere pre-analysis plan, which primarily served to pre-specify the key outcome variables of interest: profits, wages, job retention, and firm survival. The paper retains pretty close fidelity to these primary outcome variables of interest. However, we did not predict the organizational phenomenon we observed in the experiment and thus did not pre-specify the trade split we have presented in the paper.

¹⁵Bassi 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.

perimental 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.¹⁶ In total, the experimental sample includes 539 workers.¹⁷

3.2 Randomization

We implement a two-stage randomization. Stratified by firm owner gender, trade, 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.¹⁸ 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,

¹⁶One 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.

¹⁷Total firm size averages four workers at baseline excluding the firm owner (See Appendix 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.

¹⁸Cosmetology 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.

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.¹⁹

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-up survey, over two thirds of cash beneficiaries reported 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 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 2021.²⁰

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). Profits and sales are measured using monthly self-reports as in De Mel et al. (2008).²¹

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

¹⁹These 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 beneficiaries reported positive mobile money balances of about 240 GhC after loan repayment.

²⁰Note that our nominal transfer amount of 700 GhC in December 2021 is about 680 GhC in October 2021 Ghana Cedis.

²¹In an earlier circulated version, we wrongly winsorized firm financial outcomes within a larger sample including the dropped sample of firms in masonry and welding. We have corrected this by using non-winsorized measures in this version, as outliers within our main analysis sample are few.

knowledge, what were sales earned by the business due to work you completed?”²² 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 the final follow-up in January 2023, we asked all parties questions on cash transfer usage. We also asked workers about the resale value of worker-owned trade-specific capital, measured using the same four asset subgroups as firm-level assets. We made a point to differentiate worker-owned assets from assets that belong to the firm owner but are *assigned* to the worker.

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 21 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 across all covariates at conventional levels using

²²Bassi 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.

an F-test of joint significance in both the firm- and worker-level tests, when comparing the firm-transfer to the control group and when comparing the firm-transfer to the worker-transfer group. For tests of joint orthogonality comparing the worker-transfer and control groups at the firm- and worker-levels, we fail to reject joint orthogonality if we exclude firm assets and test for joint orthogonality across the remaining covariates.

We reject zero in at least one bilateral test for three individual firm-level covariates: baseline number of workers (β_1), firm assets (β_1 - β_2), and number of no-income adults in the family (β_1 - β_2). In firm-level specifications, we control for these three covariates. We reject zero in at least one bilateral test for three individual worker-level covariates: baseline number of workers (β_1), worker gender (β_2), and whether the worker's household has a farm (β_1 and β_2). In worker level specifications, we control for both firm- and worker-level imbalanced covariates, which yields five control variables: baseline number of workers, firm assets, number of no-income adults in the firm owner's family, worker gender, and whether the worker's household has a farm.

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,²³ $PeerT_i$ is a dummy indicating the peer-transfer group,²⁴ 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

²³Note 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.

²⁴This 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.

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. As 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.

4 Results

4.1 Direct, Upstream, and Downstream Impacts of Cash Transfers

Our key experimental findings are summarized in Table 1 for firm outcomes, and Tables 2 and 3 for worker outcomes. Note that sample sizes differ between Table 2 and Table 3 due to slightly different individuals attriting from the owner and worker samples. Table 3 also excludes Column (6) as we only have a worker-report for this measure. All three tables stack all five follow-up rounds, with the exception of Table 2 Column (6). We only observe this 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 no impact of either treatment on firm survival or worker retention. Still, we present results both unconditionally (Panels A) and conditional on firm survival and retention (Panels B).²⁵ 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 (6) and Tables 2 and 3 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 (1)); 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

²⁵Appendix Figures A2 and A3 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.

response to the positive liquidity shock (Table 1 Column (2)), relative to their counterparts in the control group.²⁶ This firm size increase is driven by newly-hired workers in firm-transfer firms. These new workers' average wages are lower than new workers in control firms and about half the size of the average wage for our reference workers, potentially consistent with recent evidence from Uganda of redistribution through employment (Macchi and Stalder, 2023). This finding on firm size is also 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 value of assets owned by workers in the control group among workers still at the firm is 229 GhC and 40% of control group workers still at the firm reported ownership of at least some trade-specific capital. The worker-transfer intervention almost doubles the contribution to capital, driven both by additional contributions from already contributing workers and additional workers contributing to capital. These effects are statistically different both from the control group and from the firm-transfer group.

The asset-holding value increase for workers in the worker-transfer group is measured 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 (1). 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 288 GhC (Appendix Table A8). This number is quite close to our estimate of the worker-owned asset increases in the worker-transfer group (251 GhC) measured at the same time. We therefore conclude that, while we

²⁶Firm 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; while 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.

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 (3), (4), and (5). 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 beneficiary 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 and 3 Columns (3), (4), and (5). *Worker sales* in Column (5) of Table 2 is our worker-reported measure of worker productivity, as discussed in Section 3.4. It suggests increases in worker productivity in equal magnitude (about 12%) resulting from both treatments. *Worker sales* in Column (5) of Table 3 is the owner-reported measure of worker productivity, with qualitatively similar results. These findings are 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 (Columns (3) and (4) in Tables 2 and 3). 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 beneficiaries 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 op-

erations.

4.2 Why Do Cash Transfers to Workers Increase Productivity?

Measured worker productivity and firm profits 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 4 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 4 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 4 Columns (3) and (4)), suggesting these explanations are unlikely to be driving our effects.²⁷

We also rule out firm-level changes in other sources of capital, finding no impact on capital rental expenses in Column (5) of Table 4. Though all estimates presented in this paper are reduced form (rather than an instrumented estimate of returns to

²⁷Our measure of other income originally intended to capture all earnings outside the reference firm. In each of the rounds, we ask workers specifically about any self-employment income, which was intended to include side jobs or moonlighting in one's primary trade as earnings from owning a side business. We determined late in the data collection that our self-employment earnings measure may have been missing some of this moonlighting activity and therefore collected a separate and additional measure of side jobs in only the December 2022 data collection. Point estimates on income from side jobs using the December 2022 measure for both owner-transfer and worker-transfer groups are negative and insignificant. We thus focus on the stacked panel, which implicitly contains the portion of side jobs that was accurately reported as side business income in the panel.

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.

4.3 Changes in Work Contracts

Wages increase for workers in the worker-transfer group, but not for workers in the firm-transfer group, despite comparable increases in firm profits and measured worker productivity. One explanation for this difference could be a capital rental contract, where the increase in worker wages comes from direct payment for the rental of their capital. We carefully measure capital rental payments by the firm owner separately from worker wage payments in our survey. Column (5) of Table 4 renders this simplest explanation unlikely, as we find no evidence of a change in capital rental expenses associated with either treatment.

Another possible explanation is that the wage increase simply stems from differential increases in worker productivity, which we already ruled out above. Another simple explanation that appears to be ruled out by our main findings is differential increases in sales (under a fixed revenue-sharing contract), for which we find no evidence. In addition, the reference worker wage evidence is also not consistent with a simple test of an upward sloping labor supply curve (where the increase in firm size in the firm-transfer group should have yielded increases in wages for all workers in the firm-transfer group under monopsony).

Instead, wage increases appear to be driven by a renegotiation of the contract between workers and firms. In December 2022, we collected qualitative data on the factors that workers perceive to be key determinants of their wages. Almost nobody mentioned bargaining power explicitly. However, we do observe some differences between the worker-transfer group and all other reference workers. Workers in the worker-transfer group are 11 percentage points more likely to report *firm sales* as a determinant of their wages (controlling for strata fixed effects, p -value=.07, mean among other workers=59%), and 19 percentage points more likely to report *firm sales* as one of the top three most important determinants (controlling for strata fixed ef-

fects, p -value=.01, mean among other workers=65%). Workers in the worker-transfer group are also 13 percentage points less likely report *title or tenure* as a determinant of their wages (controlling for strata fixed effects, p -value=.03, mean among other workers=49%), and 14 percentage points less likely to report *title or tenure* as one of the top three determinants (controlling for strata fixed effects, p -value=.02, mean among other workers=25%). Together these suggest some shift in the contract; these workers need not depend on promotions or tenure to increase wages and instead lean more heavily on revenue-sharing.

4.4 Returns for Whom?

In this paper, we do not directly estimate returns to capital. However, putting aside potential violations of the exclusion restriction, we can make back-of-the-envelope comparisons of the wage increases for workers in the worker-transfer group to some benchmark measures of the returns or costs of capital. For an average capital investment in the employing firm of about 250 GhC, workers in the worker-transfer group earn 15 GhC in additional wages each month, an implied monthly rate of return of about 6%. De Mel et al. (2008) provide a benchmark in the literature of returns to capital in one-person firms of about 5-6% monthly return, quite comparable to our estimate here.

Taking asset estimates from December 2022, the same time period in which we measure worker capital contributions from (Appendix Table A8), we can see that firm owners have about 288 GhC in additional capital investment in their business, conditional on survival. Profit treatment effects are about 57 GhC, suggesting a return of about 20% for firms in this sample. One simple way to reconcile these estimates is to note that these firms are employers (not one-person firms) and thus may be more capital constrained (as suggested by e.g. Hsieh and Olken (2014)).

Another way to benchmark wage benefits for workers in the worker-transfer group is to consider the costs of capital. Steel (2016) estimate that average microfinance interest rates in Ghana are 8-10%, suggesting that returns to capital contributions to one's employer that come as wages could not justify microfinance loans to purchase capital

for this purpose. Perhaps consistent with this finding, the primary use of cash transfer funds besides trade-specific capital is various types of personal consumption or educational investments in children. Essentially all control participants report spending their 20 GhC on personal consumption. The vast majority of owners in the experimental trades (and the dropped trades) report spending on trade-specific capital. Almost all treated workers and owners also report spending at least some of their transfer on personal consumption. We have functionally zero reports of owners or workers making other types of asset investments.

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 beneficiaries of both types purchase trade-specific capital and firm production increases in equal magnitude in response to both treatments.

An important implication of the suite of findings is that firm owners appear to benefit in similar amounts, regardless of whether transfers go to firm owners or workers (profits are ultimately firm owner wages). The additional surplus however, that accrues as wages, takes different forms in our two treatment groups. In the firm-transfer group, firm owners employ new hires, making no additional wage payments to reference workers. In the worker-transfer group, reference workers are able to extract some extra surplus and firms do not employ additional workers. Though, welfare analysis is outside the scope of this paper, our evidence suggests that transfers to workers may benefit recipient workers (and their employers), but not spill over to expansions in employment. In contrast, transfers to owners may benefit *new* workers, but not existing

workers.

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 beneficiaries have potentially limited investment opportunities. We would not, for example, expect cash transfer beneficiaries to invest a cash windfall in an index fund. Bernhardt et al. (2019) show that household-level investment opportunities matter for individual cash transfer beneficiaries; 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 beneficiaries 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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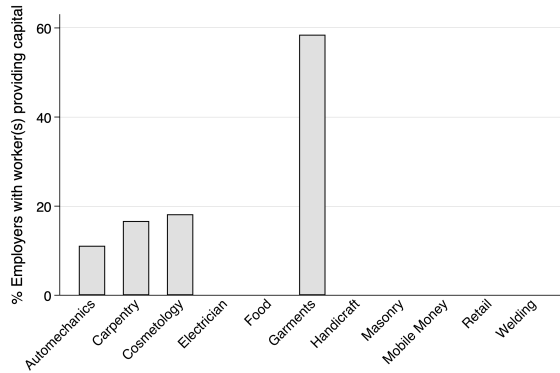
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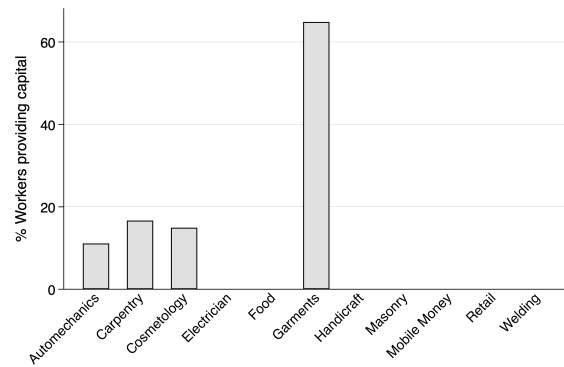
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Figure 1: Worker contribution of capital in Aburi, by industry

(a) Share of employers with worker capital



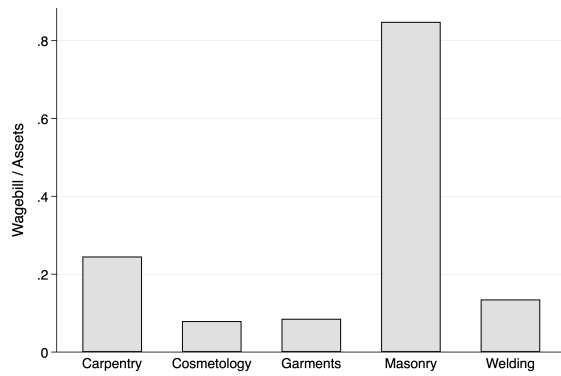
(b) Share of workers supplying capital



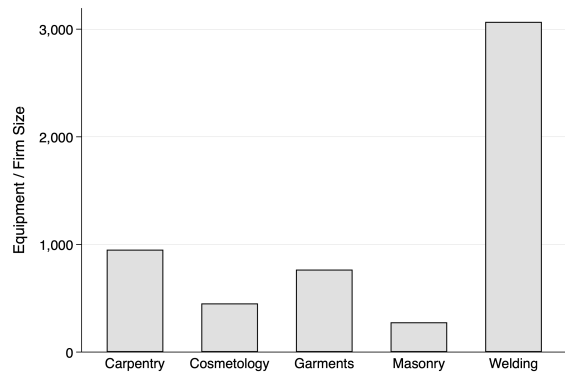
Notes: A sampled firm is considered an *employer* if it employs at least one non-owner worker. An employer is considered having worker capital if at least one of the workers brings trade-specific capital. Panel (a) plots the share of employers that have worker capital within the trade. Panel (b) plots the share of workers that supply capital within the trade. All data comes from 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 owner's 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)
	Assets	Size	Sales	Gross Profits	Profit	Owner hours
Panel A: Unconditional						
Transfer to Owner	458.2*	0.466**	163.1**	106.2***	62.54**	0.221
	(261.1)	(0.185)	(73.16)	(41.17)	(31.02)	(0.865)
Transfer to Worker	-39.45	0.144	167.8**	98.83**	68.79**	0.0948
	(203.9)	(0.167)	(69.47)	(39.57)	(32.24)	(0.944)
Observations	1706	1706	1705	1705	1705	1706
Mean (Control)	3995.50	4.12	1129.43	763.74	507.54	49.62
Prob > F	0.06	0.09	0.95	0.86	0.85	0.89
Panel B: Conditional on firm survival						
Transfer to Owner	422.3	0.450**	150.0**	99.47**	57.09*	-0.506
	(257.0)	(0.179)	(72.42)	(40.58)	(31.21)	(0.731)
Transfer to Worker	-79.35	0.117	158.5**	93.85**	65.14**	-0.367
	(203.7)	(0.167)	(68.97)	(39.21)	(32.57)	(0.798)
Observations	1671	1671	1670	1670	1670	1671
Mean (Control)	4108.05	4.23	1161.30	785.29	521.86	51.02
Prob > F	0.06	0.07	0.91	0.89	0.81	0.85

Notes: Panel A is unconditional on firm survival; every non-attributed 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. Values of assets, sales, gross profits and profits are 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 based on worker-reported measures

	(1)	(2)	(3)	(4)	(5)	(6)
	Retention	Worker hours	Wage	Wages (8h)	Worker sales	Worker assets
Panel A: Unconditional						
Transfer to Owner	0.00968 (0.0224)	0.254 (1.313)	3.731 (7.215)	0.186 (0.385)	44.83** (21.82)	65.47 (49.55)
Transfer to Worker	0.00329 (0.0255)	0.181 (1.447)	10.98 (7.426)	0.738* (0.431)	34.60 (22.03)	174.2*** (59.67)
Observations	2663	2663	2663	2663	2662	523
Mean (Control)	0.86	43.85	84.86	4.08	294.03	164.16
Prob > F	0.80	0.96	0.38	0.27	0.66	0.08
Panel B: Conditional on working at survived firm						
Transfer to Owner		-0.232 (0.752)	1.085 (8.144)	0.0224 (0.457)	40.94* (20.90)	84.95 (64.57)
Transfer to Worker		-0.385 (0.780)	13.89* (8.020)	0.870* (0.476)	39.35* (21.33)	250.9*** (75.94)
Observations		2277	2277	2277	2276	372
Mean (Control)		51.01	98.80	4.75	341.83	228.89
Prob > F		0.85	0.14	0.12	0.94	0.05

Notes: Panel A is unconditional on worker retention or survival; every non-atrited 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. Wage (8h) is the estimated daily wage for an 8-hour working day. Worker sales is the worker-reported value of firm sales contributed by the worker. Worker assets are only measured in December 2022, and are the value of trade-specific capital owned by workers. Wages, worker sales and worker assets 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 3: 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	0.0125 (0.0258)	0.172 (1.554)	-0.467 (7.476)	-0.0634 (0.438)	30.71 (22.02)
Transfer to Worker	-0.0140 (0.0301)	-0.840 (1.673)	14.13* (8.096)	0.894* (0.483)	24.97 (20.69)
Observations	2522	2522	2522	2518	2520
Mean (Control)	0.86	42.96	88.34	4.32	222.09
Prob > F	0.36	0.54	0.06	0.05	0.78
Panel B: Conditional on working at survived firm					
Transfer to Owner		-0.167 (0.804)	-2.756 (7.960)	-0.189 (0.475)	28.13 (22.47)
Transfer to Worker		0.148 (0.823)	15.74* (8.345)	1.106** (0.504)	39.25* (20.80)
Observations		2175	2175	2171	2173
Mean (Control)		49.84	102.49	5.02	257.74
Prob > F		0.69	0.03	0.02	0.57

Notes: Panel A is unconditional on owner-reported worker retention or survival; every non-attrited worker response is included. Panel B is conditional on owner-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 sales is the owner-reported relative share of sales contributed by the reference worker multiplying value of firm sales. Wages and worker sales are deflated to Ghana Cedi values in October 2021. We never asked owners the value of worker-owned trade-specific capital, so that variable is missing from this table. Standard errors in parentheses are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Alternative channels of productivity increase

	(1)	(2)	(3)	(4)	(5)
	Depressed	Consumption	Other income	Other hours	Capital expense
Panel A: Unconditional					
Transfer to Owner	-0.0244* (0.0134)	-7.150 (13.77)	11.92 (8.787)	-0.176 (0.365)	3.251 (3.241)
Transfer to Worker	0.0000693 (0.0178)	0.749 (15.89)	4.174 (9.974)	0.303 (0.425)	4.855 (3.320)
Observations	2662	2662	2663	2663	1706
Mean (Control)	0.07	225.12	12.60	1.32	15.28
Prob > F	0.10	0.58	0.53	0.23	0.63
Panel B: Conditional on working at survived firm					
Transfer to Owner	-0.0274* (0.0154)	-16.39 (15.01)	12.89 (9.998)	-0.227 (0.434)	3.243 (3.317)
Transfer to Worker	-0.000977 (0.0203)	-7.875 (15.77)	4.928 (11.59)	0.338 (0.472)	4.832 (3.399)
Observations	2276	2276	2277	2277	1671
Mean (Control)	0.07	261.91	14.81	1.55	15.71
Prob > F	0.13	0.55	0.58	0.22	0.64

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. 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	Attrited
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	0.73							
Garments	0.51	0.49							
Carpentry	0.17	0.17							
Greater Accra region	0.07	0.07							
One eligible worker	0.49	0.49							
Assets	5125.30	6202.77	-854.62	(0.61)	-2255.41	(0.16)	1400.79*	(0.10)	356
Debt	258.78	307.46	-19.52	(0.89)	-135.15	(0.22)	115.63	(0.31)	356
Sales	2082.43	1228.75	236.69	(0.65)	2574.82	(0.33)	-2338.13	(0.35)	356
Profit	787.08	533.83	13.54	(0.94)	821.91	(0.35)	-808.37	(0.33)	356
Wagebill	582.12	356.04	92.61	(0.50)	659.74	(0.31)	-567.13	(0.37)	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
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	0.70	0.69	0.01	(0.95)	0.01	(0.94)	-0.00	(0.99)	356
Num. no-income adults	0.77	0.79	-0.17	(0.27)	0.10	(0.55)	-0.27*	(0.08)	356
Other income (win)	74.81	57.92	45.92	(0.44)	8.47	(0.73)	37.45	(0.54)	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
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)				(0.22)		(0.04)		(0.14)	
F-test of joint sig. without Assets (win) (p-value)				(0.28)		(0.16)		(0.49)	

Notes: Each coefficient is from a separate regression of baseline owner-level covariates on treatment assignments and strata fixed effects. Wagebill, sales, profits, assets and debt are 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										
Assets	5446.59	6981.73	-1621.70	(0.44)	-2703.07	(0.15)	1081.37	(0.20)	539	
Num. workers	4.41	4.58	-0.60*	(0.09)	-0.10	(0.76)	-0.50	(0.14)	539	
Worker hours	47.14	46.93	0.04	(0.98)	0.32	(0.80)	-0.28	(0.82)	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)				(0.36)	F-test of joint sig. (p-value)		(0.04)	F-test of joint sig. (p-value)		(0.83)
F-test of joint sig. without Assets (win) (p-value)				(0.46)	F-test of joint sig. without Assets (win) (p-value)		(0.31)	F-test of joint sig. without Assets (win) (p-value)		(0.98)

Notes: Each coefficient is from a separate regression of baseline worker-level covariates on treatment assignments and strata fixed effects. Values of assets and wages 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)	(7)
	Retention	Worker hours	Wage	Wages (8h)	Worker sales	Worker-owned assets	Worker assets used m
Panel A: Unconditional							
Transfer to Owner	0.0108 (0.0225)	0.254 (1.305)	3.753 (7.123)	0.202 (0.386)	46.58** (21.75)	64.88 (49.41)	32.08 (44.00)
Transfer to Worker	0.00384 (0.0255)	0.245 (1.440)	10.79 (7.234)	0.738* (0.428)	34.46 (21.90)	173.1*** (59.44)	119.3** (57.62)
Observations	2367	2367	2367	2367	2366	467	467
Mean (Control)	0.86	43.85	84.86	4.08	294.03	164.16	147.98
Prob > F	0.79	0.99	0.40	0.28	0.60	0.08	0.13
Panel B: Conditional on working at survived firm							
Transfer to Owner		-0.248 (0.751)	1.191 (8.154)	0.0339 (0.456)	42.99** (20.75)	88.88 (64.41)	44.18 (57.36)
Transfer to Worker		-0.365 (0.782)	13.70* (8.025)	0.858* (0.473)	39.44* (21.16)	251.9*** (75.96)	188.0** (74.70)
Observations	2367	2022	2022	2022	2021	333	333
Mean (Control)	0.86	51.01	98.80	4.75	341.83	228.89	205.72
Prob > F	0.79	0.88	0.15	0.13	0.87	0.05	0.07

Notes: Peer-treated worker responses are dropped for all regressions. Panel A is unconditional on worker retention or survival; every non-attributed 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 sales is the worker-reported value of firm sales contributed by the worker. Worker assets are only measured in December 2022, which equals the value of the capital that workers own. 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)
	Assets (win)	Size	Sales (win)	Gross Profits (win)	Profit (win)	Owner hours
Panel A: Unconditional						
Transfer to Owner	236.1 (337.0)	0.237 (0.216)	165.9* (87.21)	71.99 (49.50)	57.75* (34.31)	-0.563 (0.981)
Transfer to Worker	-373.8 (297.8)	0.0643 (0.206)	247.3 (160.9)	100.7 (66.49)	73.66* (41.47)	0.125 (1.019)
Observations	1706	1706	1705	1705	1705	1706
Mean (Control)	3995.50	4.12	1129.43	763.74	507.54	49.62
Prob > F	0.04	0.43	0.60	0.66	0.70	0.51
Panel B: Conditional on firm survival						
Transfer to Owner	186.8 (340.6)	0.209 (0.216)	154.4* (87.30)	63.76 (49.53)	52.04 (34.58)	-1.203 (0.855)
Transfer to Worker	-422.6 (301.8)	0.0385 (0.207)	238.9 (163.6)	94.55 (67.44)	69.52 (42.15)	-0.332 (0.884)
Observations	1671	1671	1670	1670	1670	1671
Mean (Control)	4108.05	4.23	1161.30	785.29	521.86	51.02
Prob > F	0.04	0.44	0.59	0.64	0.67	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. Values of assets, sales, gross profits and profits are 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)	(7)
	Retention	Worker hours	Wage	Wages (8h)	Worker sales	Worker-owned assets	Worker assets used m
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)	65.64 (52.48)	36.76 (48.49)
Transfer to Worker	0.0118 (0.0271)	0.179 (1.732)	11.41 (9.954)	0.836 (0.568)	37.99 (24.05)	163.1** (65.77)	120.2* (64.72)
Observations	2663	2663	2663	2663	2662	523	523
Mean (Control)	0.86	43.85	84.86	4.08	294.03	164.16	147.98
Prob > F	0.74	0.50	0.38	0.37	0.79	0.13	0.17
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)	91.64 (70.47)	61.22 (65.39)
Transfer to Worker		-0.431 (1.058)	13.87 (11.34)	0.977 (0.658)	38.37* (22.73)	237.1*** (81.77)	182.5** (81.40)
Observations	2663	2277	2277	2277	2276	372	372
Mean (Control)	0.86	51.01	98.80	4.75	341.83	228.89	205.72
Prob > F	0.74	0.42	0.30	0.33	0.80	0.08	0.13

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 sales is the worker-reported value of firm sales contributed by the worker. Worker assets are only measured in December 2022, which equals the value of the capital that workers own. Standard errors in parentheses are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A8: Firm treatment effects in December 2022

	(1)	(2)	(3)	(4)	(5)	(6)
	Assets (win)	Size	Sales (win)	Gross Profits (win)	Profit (win)	Owner hours
Panel A: Unconditional						
Transfer to Owner	441.9 (320.0)	0.994*** (0.313)	448.4*** (127.4)	225.7*** (73.05)	172.1*** (56.99)	3.042 (2.265)
Transfer to Worker	395.1 (307.6)	0.289 (0.296)	332.2*** (104.3)	210.6*** (79.80)	179.0*** (62.06)	3.426 (2.277)
Observations	333	333	333	333	333	333
Mean (Control)	4028.90	3.28	1065.11	689.08	492.63	47.57
Prob > F	0.88	0.03	0.36	0.84	0.91	0.85
Panel B: Conditional on firm survival						
Transfer to Owner	287.9 (291.6)	0.713** (0.290)	396.4*** (128.8)	183.7*** (69.48)	155.1*** (54.59)	-0.376 (1.431)
Transfer to Worker	200.5 (301.5)	0.140 (0.286)	285.5*** (101.7)	168.0** (79.18)	150.4** (62.25)	0.417 (1.410)
Observations	312	312	312	312	312	312
Mean (Control)	4498.28	3.66	1189.20	769.36	550.02	53.11
Prob > F	0.76	0.06	0.38	0.83	0.94	0.57

Notes: Panel A is unconditional on firm survival; every non-attrited 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. Values of assets, sales, gross profits and profits are 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 A9: Baseline Summary Statistics and Balance - Firm Outcomes for Masonry and Welding

	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	0.00	0.00							
Welding	0.55	0.55							
Greater Accra region	0.05	0.07							
One eligible worker	0.33	0.34							
Assets	18489.57	12543.79	25451.02	(0.46)	-6035.30	(0.38)	31486.31	(0.36)	82
Debt	2650.00	286.21	7291.97	(0.33)	-132.72	(0.89)	7424.69	(0.32)	82
Sales	4473.05	7394.14	-4726.85	(0.16)	-2109.90	(0.23)	-2616.95	(0.17)	82
Profit	1422.68	1954.48	-751.58	(0.21)	-499.79	(0.17)	-251.79	(0.54)	82
Wagebill	1128.72	1344.31	-290.50	(0.53)	-52.53	(0.87)	-237.98	(0.56)	82
Num. workers	4.84	4.90	-0.23	(0.70)	-0.12	(0.87)	-0.11	(0.88)	82
Firm tenure	16.18	16.26	-0.99	(0.54)	0.03	(0.99)	-1.02	(0.59)	77
Owner hours	48.29	49.83	-1.96	(0.55)	-1.71	(0.57)	-0.25	(0.94)	82
Age	42.10	43.00	-1.64	(0.38)	-1.75	(0.37)	0.10	(0.96)	77
Live with partner	0.96	0.93	0.07	(0.15)	0.03	(0.61)	0.04	(0.32)	82
Num. adults	4.59	3.97	1.04*	(0.10)	0.73	(0.26)	0.31	(0.66)	82
Num. children	3.29	3.34	0.20	(0.73)	-0.45	(0.25)	0.65	(0.29)	82
Num. self-employed adults	0.61	0.69	-0.13	(0.56)	-0.10	(0.67)	-0.02	(0.92)	82
Num. no-income adults	1.28	1.00	0.86**	(0.03)	-0.08	(0.83)	0.94**	(0.03)	82
Other income	152.80	132.07	133.70	(0.54)	-76.89	(0.42)	210.59	(0.29)	82
Phone spending	39.21	47.31	-9.42	(0.68)	-7.43	(0.57)	-1.99	(0.92)	82
Go out spending	47.10	50.48	-6.12	(0.56)	3.07	(0.84)	-9.19	(0.54)	82
Satisfaction	7.22	7.09	0.14	(0.65)	0.21	(0.48)	-0.07	(0.82)	81
Owner productivity	39.72	42.07	-1.22	(0.70)	-5.92*	(0.09)	4.70	(0.17)	82
Other workers productivity	18.90	17.59	1.10	(0.73)	2.71	(0.46)	-1.61	(0.67)	82
Risk averse	0.57	0.62	-0.09	(0.52)	-0.03	(0.84)	-0.06	(0.65)	82
F-test of joint sig. (p-value)				(0.00)		(0.00)		(0.00)	
F-test of joint sig. without Assets (win) (p-value)				(0.00)		(0.00)		(0.00)	

Notes: Each coefficient is from a separate regression of baseline owner-level covariates on treatment assignments and strata fixed effects. Wagebill, sales, profits, assets and debt are 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 A10: Baseline Summary Statistics and Balance - Worker Outcomes for Masonry and Welding

	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									
Assets	20588.88	13372.71	28657.57	(0.46)	-4785.52	(0.52)	33443.09	(0.36)	138
Num. workers	5.12	5.21	-0.30	(0.65)	-0.14	(0.85)	-0.16	(0.83)	138
Worker hours	43.57	45.15	-2.31	(0.54)	-1.72	(0.62)	-0.59	(0.87)	138
Finished apprentice	0.14	0.10	0.06	(0.37)	0.04	(0.64)	0.03	(0.76)	138
Worker Tenure	5.21	5.25	0.21	(0.84)	-0.76	(0.43)	0.97	(0.38)	138
WORKER-REPORTED									
Wage	307.01	338.44	46.01	(0.47)	-66.17	(0.19)	112.19*	(0.08)	138
Female	0.02	0.02	0.00	(1.00)	0.01	(0.75)	-0.01	(0.78)	138
Age	25.68	24.62	2.04	(0.16)	0.46	(0.78)	1.58	(0.40)	138
Married	0.38	0.35	0.09	(0.43)	-0.06	(0.62)	0.14	(0.22)	138
Live with partner	0.38	0.35	0.09	(0.43)	-0.06	(0.62)	0.14	(0.22)	138
Num. adults	3.80	3.33	1.47***	(0.01)	-0.26	(0.68)	1.73**	(0.02)	138
Num. children	2.17	2.23	0.33	(0.42)	-0.61	(0.24)	0.93*	(0.08)	138
Num. self-employed adults	0.68	0.77	-0.13	(0.54)	-0.16	(0.53)	0.03	(0.92)	138
Num. no-income adults	1.35	1.08	0.73**	(0.04)	-0.01	(0.98)	0.74	(0.10)	138
Personal spending	20.46	19.92	-1.12	(0.83)	1.96	(0.69)	-3.08	(0.60)	138
Risk averse	0.62	0.67	-0.11	(0.32)	-0.09	(0.45)	-0.02	(0.87)	138
Owner's family	0.08	0.06	0.01	(0.76)	-0.01	(0.83)	0.03	(0.69)	138
Previously unknown to owner	0.28	0.38	-0.18*	(0.07)	-0.14	(0.25)	-0.04	(0.65)	138
Depressed	0.06	0.10	-0.07	(0.17)	-0.03	(0.73)	-0.05	(0.41)	138
Farming	0.15	0.17	0.00	(0.97)	-0.06	(0.48)	0.06	(0.44)	138
F-test of joint sig. (p-value)				(0.00)	(0.82)		(0.02)		
F-test of joint sig. without Assets (win) (p-value)				(0.00)	(0.87)		(0.03)		

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

Table A11: Firm Treatment Effects in Masonry and Welding

	(1)	(2)	(3)	(4)	(5)	(6)
	Assets	Size	Sales	Gross Profits	Profit	Owner hours
Panel A: Unconditional						
Transfer to Owner	387.2 (461.5)	0.135 (0.294)	272.5 (467.5)	99.74 (296.7)	166.6 (143.3)	3.661 (2.345)
Transfer to Worker	636.3 (695.9)	-0.234 (0.405)	-685.1 (422.5)	-338.9 (290.8)	-106.7 (130.3)	1.428 (2.640)
Observations	398	398	398	398	398	398
Mean (Control)	4171.37	4.51	3030.72	1953.34	1097.98	42.31
Prob > F	0.67	0.26	0.02	0.07	0.06	0.42
Panel B: Conditional on firm survival						
Transfer to Owner	339.0 (420.9)	-0.0703 (0.300)	296.7 (468.0)	63.26 (296.4)	105.0 (139.2)	1.645 (2.266)
Transfer to Worker	811.3 (690.6)	-0.123 (0.380)	-499.4 (421.2)	-285.7 (296.7)	-105.5 (124.8)	2.470 (1.953)
Observations	381	381	381	381	381	381
Mean (Control)	4354.06	4.71	3163.45	2038.89	1146.06	44.17
Prob > F	0.41	0.87	0.05	0.13	0.15	0.69

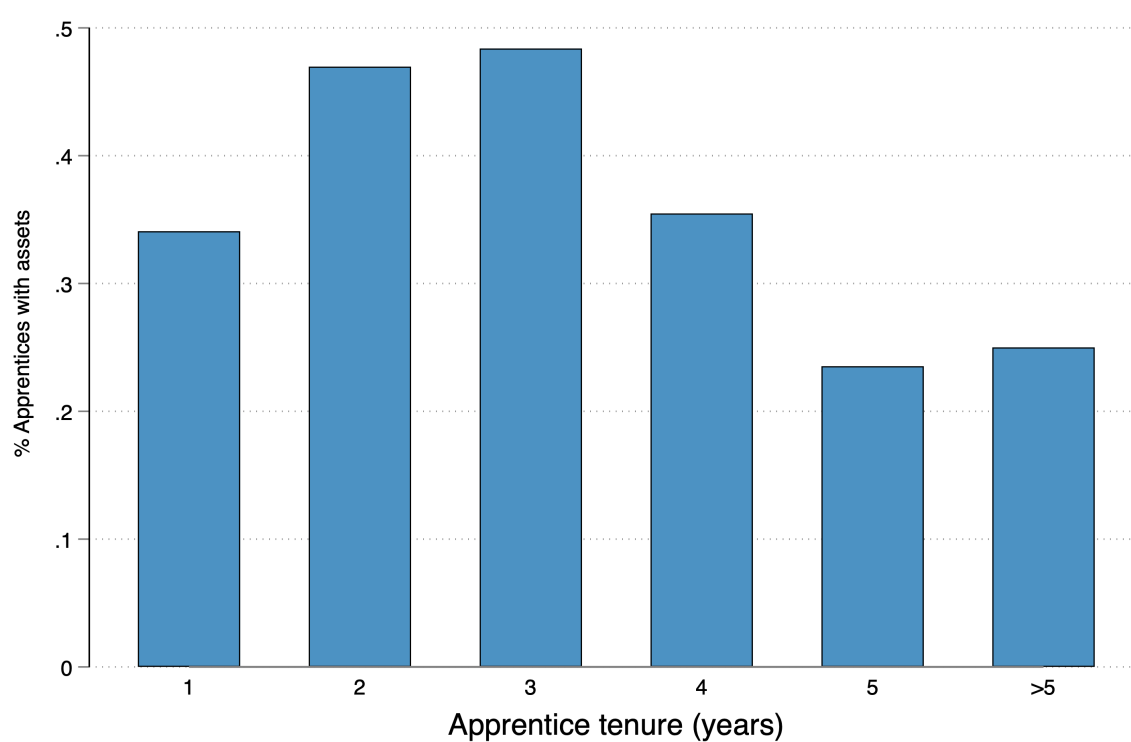
Notes: Panel A is unconditional on firm survival; every non-attrited owner response is included. Panel B is conditional on firm survival. Regressions include strata fixed effects, imbalanced baseline control variables and PDSLASSO selected baseline control variables. Values of assets, sales, gross profits and profits are 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 A12: Worker Treatment Effects in Masonry and Welding

	(1)	(2)	(3)	(4)	(5)	(6)
	Retention	Worker hours	Wage	Wages (8h)	Worker sales	Worker assets
Panel A: Unconditional						
Transfer to Owner	0.0409 (0.0372)	3.202 (2.917)	36.62 (29.71)	0.318 (2.210)	203.6** (94.21)	282.3 (189.1)
Transfer to Worker	0.000345 (0.0470)	0.682 (2.890)	-36.27 (23.22)	-0.637 (2.452)	9.677 (83.25)	5.023 (138.0)
Observations	669	669	669	668	669	130
Mean (Control)	0.89	38.20	199.86	14.57	573.03	135.89
Prob > F	0.36	0.36	0.01	0.61	0.04	0.20
Panel B: Conditional on working at survived firm						
Transfer to Owner		2.377 (1.975)	-2.283 (23.11)	0.301 (2.209)	88.33 (62.87)	297.3 (220.0)
Transfer to Worker		2.277 (2.292)	-35.69 (23.72)	-1.673 (2.370)	12.71 (64.07)	-56.29 (172.5)
Observations		613	613	612	613	106
Mean (Control)		42.75	222.72	16.33	638.59	182.49
Prob > F		0.96	0.13	0.29	0.30	0.18

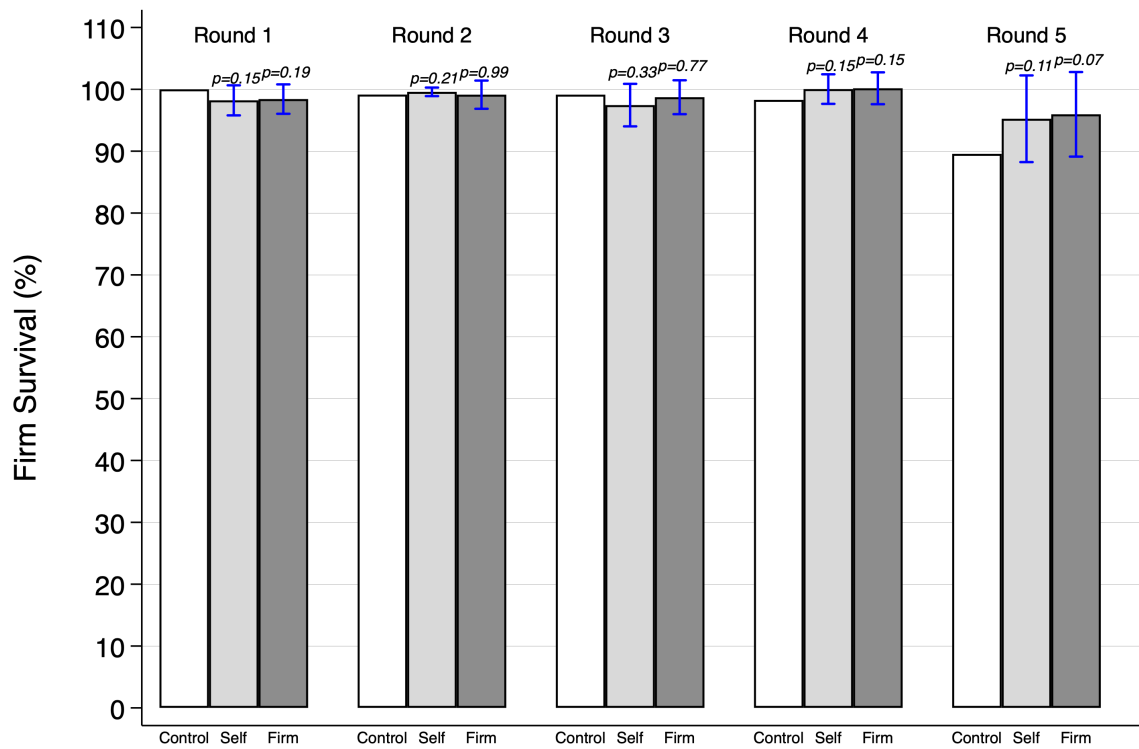
Notes: Panel A is unconditional on worker retention or survival; every non-attrited worker response is included. Panel B is conditional on workers-reported retention, and firm survival. Regressions include round fixed effects, strata fixed effects, imbalanced baseline control variables and PDSLASSO selected 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 owned by workers. Worker sales is the worker-reported value of firm sales contributed by the worker. Worker assets are only measured in December 2022, which equals the value of the capital that workers own. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure A1: Share of Apprentices with Assets by Tenure at Firm in Aburi



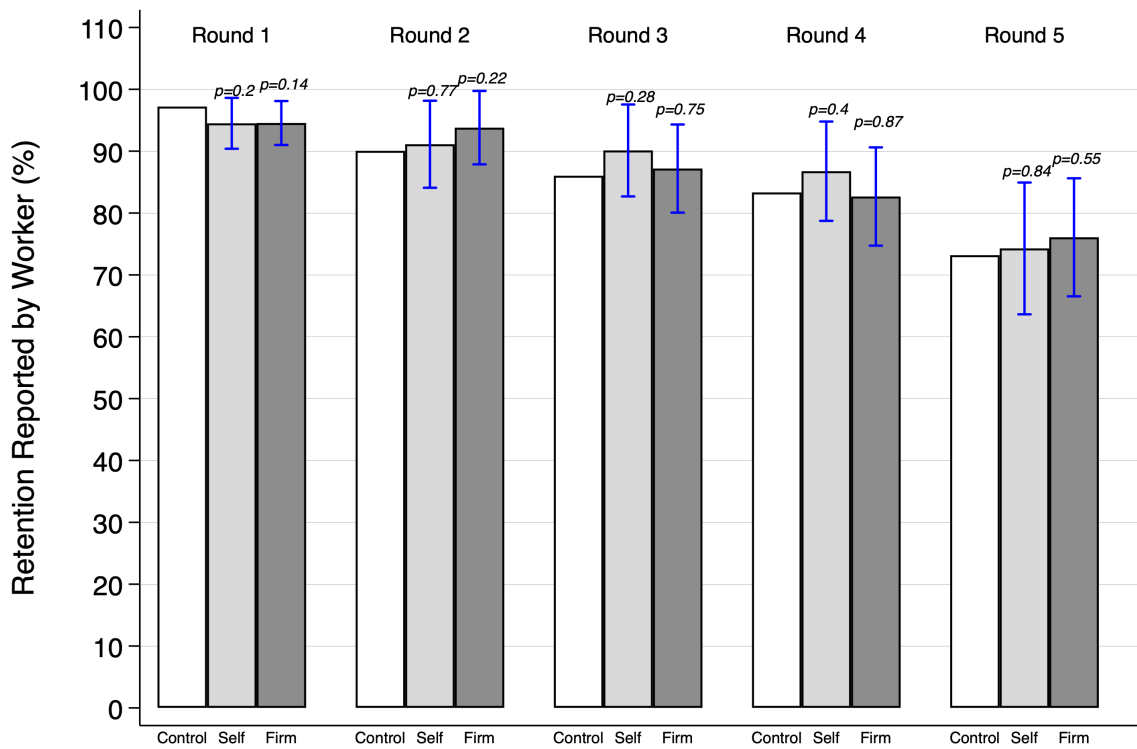
Notes: Here we present the share of apprentices that own trade-specific capital by tenure at the reference firms in years, based on data collected in Aburi in June 2023.

Figure A2: 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 A3: 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.