

# Do Workers Benefit from Firm-Level Capital Interventions? Evidence from a Systematic Review

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## ABSTRACT

# Do Workers Benefit from Firm-Level Capital Interventions? Evidence from a Systematic Review \*

This paper investigates to what extent providing capital to firms generates direct economic benefits for workers. We conduct a systematic review of randomized interventions in low- and middle-income countries that boost firm capital through transfers or credit, finding ten suitable experiments. Using firm-level micro-data from eligible studies, we estimate a Bayesian Hierarchical Model to quantify the effects on firm revenue and worker outcomes. We find that workers benefit substantially from these interventions: on average, the wage bill rises proportionally with revenue, by about .15 of a standard deviation.

**JEL Classification:**

O12, O15, M52

**Keywords:**

wage effects, firm interventions, low- and middle-income countries, Bayesian Hierarchical Model, systematic meta-analysis

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# 1 Introduction

Firm growth is a key focus of policy in low- and middle-income countries. This is at least in part because firm growth may generate substantial and durable downstream benefits for workers, through either higher employment or higher wages. However, the extent to which these benefits occur in practice has not been systematically documented. If, as standard neoclassical models predict, increases in firm revenue are matched with proportional increases in total worker compensation, so that the ratio of labor costs to revenue remains constant, then policies that achieve firm growth will generate substantial benefits for workers. Conversely, if the gains from firm growth accrue primarily to firm owners, such interventions may have more circumscribed effects on worker incomes and welfare.

In this paper, we present the first meta-analysis that quantifies the impacts of a specific type of firm-level intervention on total worker compensation (the ‘wage bill’) and on the wage share (wage bill/revenues). We focus on interventions that enable firms to expand the capital used in production through either transfers or credit (we will refer to these as ‘capital interventions’). A large and growing literature evaluates programs that have these features. These include microfinance programs, asset-based lending, and large-scale cash transfer programs that involve business owners. Randomized controlled trials across low- and middle-income countries have generated important evidence on how these interventions affect firm outcomes such as investment, profits, and revenue. However, much less is known about the extent to which the resulting gains are shared with workers within treated firms. Crucially, while several studies record information on the wages paid to workers, most papers only document impacts on employment — an incomplete metric of downstream impacts.

Our central contribution is to show that capital interventions generate substantial benefits for workers. We find evidence of a stable wage share. We also estimate that the average intervention boosts the total wage bill by .15 of a standard deviation, and that there is limited heterogeneity across studies on this margin of impact.

To reach this conclusion, we conduct a systematic review of randomized experiments that increase firms’ access to capital in low- and middle-income countries and collect firm-level microdata from eligible studies. Using these data, we estimate the impact of capital provision on firm revenue and worker outcomes, including total wage payments and the wage share of revenue. Our analysis combines data from ten randomized experiments across multiple countries and intervention types. To synthesize evidence across heterogeneous contexts, we estimate treatment effects using a Bayesian hierarchical model following Meager (2019). This framework allows us to estimate both the average effect of capital interventions and the degree of heterogeneity across studies. The empirical analysis focuses on three key outcomes: firm revenue, the total wage bill, and the wage bill share of revenue. Together, these outcomes allow us to measure the extent to which firm growth translates into higher worker income, providing an estimate of the pass-through from firm performance to labor earnings.

Our results show that capital interventions modestly increase firm revenue and generate substantial increases in total wage payments. At the same time, we find little evidence that the share of firm revenue paid to workers changes systematically. Finally, we also find that the increase in total wage payments is driven by higher compensation per worker — impacts on total employment are indistinguishable from zero. These findings suggest that workers benefit primarily through firm expansion—such as increases in employment or scale—rather than through changes in the distribution of income within firms. By quantifying how worker income responds to firm growth, our study provides new evidence on the inclusiveness of firm-level development interventions. More broadly, it contributes to understanding whether policies that promote firm growth can serve as effective tools for improving the welfare of workers in low- and middle-income economies.

We contribute to three strands of the literature. First, the literature on firm directed interventions, including research on capital drops (e.g., [4]), unconditional cash transfers (e.g., [8]), and microfinance or loan-based programs (e.g., [3]; [5]). In particular, this study advances the existing evidence by examining a dimension of impacts of these interventions that is often imperfectly documented in these studies. Second, methodologically, we employ a Bayesian hierarchical model following [10], which enables the joint estimation of treatment effects across studies while appropriately pooling information according to underlying heterogeneity in effect sizes. Third, and more broadly, we contribute to the literature that studies the distributional impacts of growth. While this literature has focused on macro or structural approaches (e.g., [1]), we propose a novel angle on this question: a meta-analysis of a central structural parameter that determines how the benefits of firm growth are passed to workers: the stability of the wage share.

## 2 Data and Sample Section

We have compiled studies from ECONLIT, RePEc, J-PAL, IPA, and the World Bank Poverty Impact Evaluations Database. Keyword searches were combined with citation tracing and author website searches. To ensure relevance, studies had to include keywords indicating both firm-level interventions and worker outcomes. Eligible studies met the following criteria:

1. Randomized allocation to a treatment that increases firm capital.
2. Credible study design with attrition below threshold levels (8% per treatment arm; 25% overall).
3. Conducted in low- or middle-income countries.
4. At least one wave of endline data.
5. Data on firm revenue and at least one worker outcome (wages, training, or hours worked).

6. Minimum of 30 firms with at least one paid employee in the sample.

For each eligible study, we construct standardized variables to enable cross-study comparability. Primary outcomes variables are: firm revenue and wage share, defined as the total wage bill as a proportion of revenue, which we will call wage share.<sup>1</sup> All outcome variables are standardised and winsorised to 1%, within studies. From the systematic search we identified ten experiments from nine papers meeting all criteria. Data availability, particularly on worker wages, was the main constraint limiting study inclusion. Table 1 summarizes their characteristics.

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<sup>1</sup>In the PAP we specified the same outcome variables but as a change between baseline and the follow up survey closest to a year after a baseline. We drop the change in aspect of the variables for ease of interpretation given that both sets of results are very similar. Results for the original definition are reported in the appendix.

Table 1: Summary of Studies

| Paper Title                                                                                                             | Authors                                                                | Journal             | Intervention                                                                  | Value (USD) | Follow-up   | Country                |
|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------|-------------|-------------|------------------------|
| Big Loans to Small Businesses: Predicting Winners and Losers in an Entrepreneurial Lending Experiment (BL) [5]          | Bryan, G.T., Karlan, D., Osman, A.                                     | <i>AER</i>          | 2-4x larger than standard loan                                                | 310         | 20 months   | Egypt                  |
| General Equilibrium Effects of Cash Transfers: Experimental Evidence from Kenya (GE) [8]                                | Egger, D., Haushofer, J., Miguel, E., Niehaus, P., Walker, M.          | <i>Econometrica</i> | Unconditional cash transfer                                                   | 1,871       | 9-31 months | Kenya                  |
| Seasonal Liquidity, Rural Labor Markets, and Agricultural Production (SL) [9]                                           | Fink, G., Jack, B.K., Masye, F.                                        | <i>AER</i>          | Cash loan and maize loan                                                      | 33          | 2-9 months  | Zambia                 |
| Indirect Effects of Access to Finance (AC) [6]                                                                          | Cai, J., Szeidl, A.                                                    | <i>AER</i>          | Loans without collateral and 15% discount                                     | 49,000      | 24 months   | China                  |
| Estimating the impact of microcredit on those who take it up: Evidence from a randomized experiment in Morocco (MA) [7] | Crépon, B., Devoto, F., Duflo, E., Parienté, W.,                       | <i>AEJ</i>          | Group Liability Microfinance                                                  | 124-1855    | 24 months   | Morocco                |
| The Impacts of Microcredit: Evidence from Bosnia and Herzegovina (BO)                                                   | Augsburg, B., De Haas, R., Harngart ,H., Meghir, C.                    | <i>AEJ</i>          | Loans to marginal applicants                                                  | 1012        | 14 months   | Bosnia and Herzegovina |
| The Impacts of Microfinance: Evidence from Joint-Liability Lending in Mongolia (JL) [2]                                 | Attanasio, O., Augsburg, B., De Haas, R., Fitzsimons, E., Harngart, H. | <i>AEJ</i>          | Microcredit                                                                   | 386         | 19 months   | Mongolia               |
| Debt Traps? Market Vendors and Moneylender Debt in India and the Philippines (PH) *                                     | Karlan, D., Mullainathan, S., Roth, B.                                 | <i>AEJ</i>          | Paying off high interest debt                                                 | 44 and 70   | 24 months   | Philippines            |
| Asset-Based Microfinance for Microenterprises: Evidence from Pakistan (AB) [4]                                          | Bari, F., Malik, K., Meki, M., Quinn, S.                               | <i>AER</i>          | Finance of business assets (control has access to zero interest loan for 475) | 1900        | 24 months   | Pakistan               |

Notes: \* The data set for the paper 'Debt Traps? Market Vendors and Moneylender Debt in India and the Philippines' consists of three separate RCT studies two of which meet the inclusion criteria the are included as separate studies in the results section (PH07 & PH10).

### 3 Method: Bayesian Hierarchical Model

We estimate firm-level outcomes using a Bayesian hierarchical model following Meager (2019):

$$y_{ik} \sim N(\mu_k + \tau_k \mathbf{T}_{ik}, \sigma_{y_k}^2), \quad \begin{pmatrix} \mu_k \\ \tau_k \end{pmatrix} \sim N\left(\begin{pmatrix} \mu \\ \tau \end{pmatrix}, V\right), \quad V = \begin{bmatrix} \sigma_\mu^2 & \sigma_{\tau\mu} \\ \sigma_{\tau\mu} & \sigma_\tau^2 \end{bmatrix}.$$

In this model, individual-level data (indexed by  $i$ ) is used to estimate the average treatment effect,  $\tau_k$  of binary treatment status,  $\mathbf{T}_{ik}$ , for outcome variables,  $y_{ik}$  across  $k$  studies. In the second level, control means,  $\mu_k$  and treatment effects,  $\tau_k$  are assumed to be jointly normal and drawn from a distribution with means  $\mu$  and  $\tau$ . Priors are permissive, reflecting minimal prior knowledge, and robustness is assessed by varying prior scales.

### 4 Sample Characteristics

Tables 2 reports baseline summary statistics for baseline revenue across studies. Reporting overall sample size  $N$ , Mean, standard deviation and sample size for treatment and control groups. The study sample is restricted to firms with a positive wage bill as baseline. Tables 9 and 4 follow the same structure and report results for baseline total wage bill and wage share respectively.

| Study | N    | Mean       | SD        | Treated | Control |
|-------|------|------------|-----------|---------|---------|
| AC    | 3167 | 1033036.51 | 889000.00 | 1433    | 1734    |
| BL    | 286  | 343352.18  | 602317.87 | 144     | 142     |
| SL    | 90   | 2021.41    | 1403.00   | 6       | 84      |
| GE    | 5423 | 6065.17    | 3332.19   | 2739    | 2684    |
| MA    | 44   | 24060.30   | 22804.54  | 21      | 23      |
| BO    | 475  | 49422.58   | 88220.70  | 253     | 222     |
| JL    | 84   | 166419.08  | 149934.00 | 61      | 23      |
| PH07  | 68   | 5775.06    | 8083.25   | 48      | 20      |
| PH10  | 42   | 58878.70   | 62454.27  | 27      | 15      |
| AB    | 297  | 49594.49   | 46786.80  | 205     | 92      |

Table 2: Summary statistics for baseline revenue

| Study | N    | Mean     | SD       | Treated | Control |
|-------|------|----------|----------|---------|---------|
| AC    | 3167 | 64104.58 | 48141.43 | 1433    | 1734    |
| BL    | 286  | 20089.58 | 22448.88 | 144     | 142     |
| SL    | 94   | 19.77    | 17.78    | 8       | 86      |
| GE    | 5423 | 301.68   | 355.03   | 2739    | 2684    |
| MA    | 48   | 7227.18  | 14577.03 | 24      | 24      |
| BO    | 746  | 10343.74 | 39781.41 | 394     | 352     |
| JL    | 84   | 21324.32 | 16678.35 | 61      | 23      |
| PH07  | 68   | 4.43     | 3.93     | 48      | 20      |
| PH10  | 42   | 2864.88  | 2539.60  | 27      | 15      |
| AB    | 297  | 8447.68  | 9119.23  | 205     | 92      |

Table 3: Summary statistics for baseline wage bill

| Study | N    | Mean | SD   | Treated | Control |
|-------|------|------|------|---------|---------|
| AC    | 3167 | 0.08 | 0.10 | 1433    | 1734    |
| BL    | 286  | 0.18 | 0.22 | 144     | 142     |
| SL    | 89   | 0.01 | 0.02 | 6       | 83      |
| GE    | 5416 | 0.14 | 2.52 | 2735    | 2681    |
| MA    | 37   | 0.79 | 3.33 | 16      | 21      |
| BO    | 474  | 0.28 | 2.16 | 252     | 222     |
| JL    | 84   | 0.21 | 0.27 | 61      | 23      |
| PH07  | 68   | 0.01 | 0.03 | 48      | 20      |
| PH10  | 42   | 0.07 | 0.07 | 27      | 15      |
| AB    | 297  | 0.20 | 0.15 | 205     | 92      |

Table 4: Summary statistics for baseline wage share

Figure 1 plots the distribution of revenue across studies for the control groups at baseline. Figures 2 and 3 repeat the exercise for wage bill and wage share.

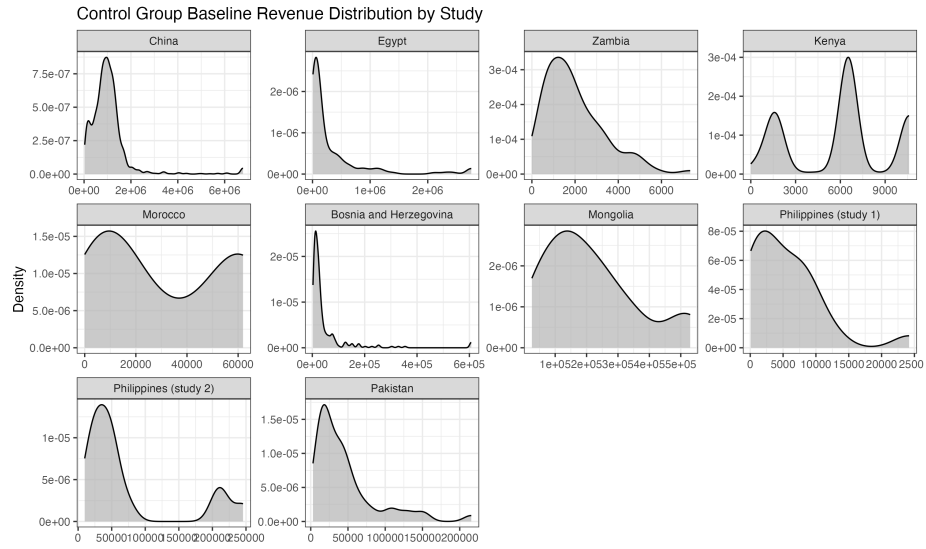


Figure 1: Control Group Revenue Distribution

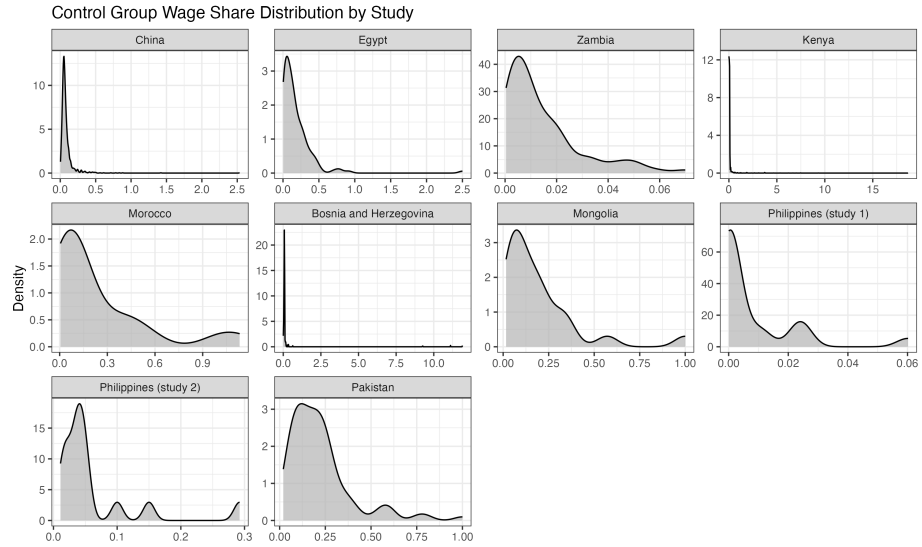


Figure 2: Control Group Wage Distribution

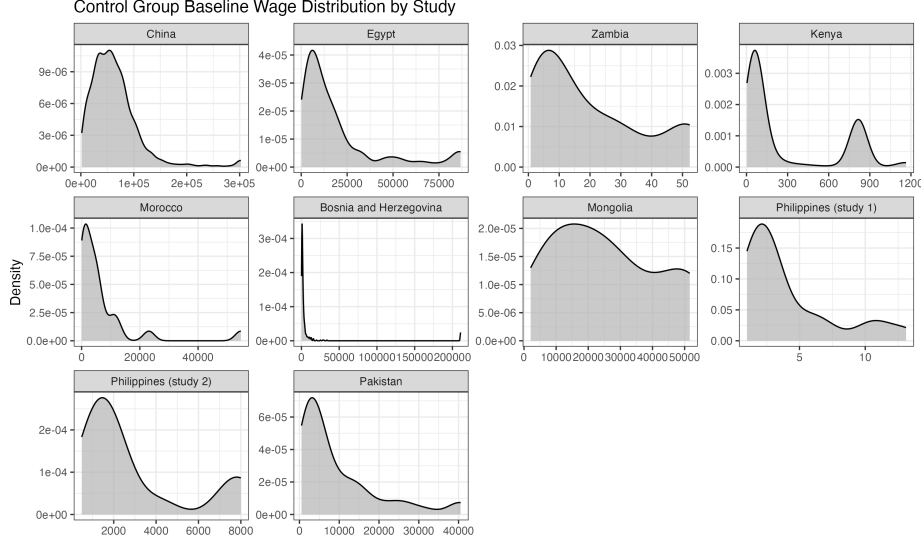


Figure 3: Control Group Wage Share Distribution

## 5 Primary Variable Results

This section reports results for the primary variables revenue and wage share and the secondary variable wage bill.

### 5.1 Impacts on Revenue

Table 5 reports the study level estimates from the Bayesian Hierarchical Model specified in section 4. The second column is the the mean of the estimated Bayesian posterior distribution of the study level treatment effect. Columns three, four and five report the standard deviation, 2.5 percentile and 97.5 percentile of the posterior distribution. Column six reports the unpooled mean estimate. This is the estimate obtained without the hierarchical model, where each study's treatment effect is estimate separately. The effect of the hierarchical model is to shrink the unpooled estimates towards the overall mean. The level of sinkage is stronger for studies that have fewer observations or which have noisier estimates. Column seven reports the Gelman shrinkage factor:  $\lambda_i = \frac{\tau^2}{\tau^2 + \frac{\sigma_i^2}{n_i}}$  which determines the extent to which the group-specific estimate is shrunk towards the overall mean in the hierarchical model. The posterior estimate for group  $i$  in the second column is a weighted average of the unpooled estimate  $\bar{y}_i$  and the pooled (overall) mean  $\tau$ :  $\theta_i = \lambda_i \bar{y}_i + (1 - \lambda_i) \tau$ .

Table 6 reports the estimates of the hyper parameters of the hierarchical model.  $\tau$  is the estimate of the mean treatment effect across study sites while  $SD$  is the estimate of the standard deviation of the distribution across

treatment sites. Each estimate has a posterior and the median standard deviation and central 95% of this posterior is reported in columns three four and five respectively.

Figure 9 provides a visual plot of estimates in tables 5 and 6. It plots the means and central 95% of the estimated treatment effect posterior distributions for individual studies, from table 5. The final row plots the estimated overall posterior distribution, from table 6.

Our central finding is that the average intervention raises revenues by about .08 of a standard deviation, with significant variation across studies (the estimated between-study standard deviation is 0.071). Despite this variation, all studies produce positive point estimates, suggesting that increasing firm capital generally leads to improvements in firm performance. The largest positive effects are observed in the studies labeled JL, MA, and AC, while negative or near-zero estimates appear in BO, PH07, and AB. However, uncertainty around individual estimates is substantial. In most cases, the 95% posterior credible intervals include zero, reflecting both limited sample sizes and substantial variation in outcomes across firms. The hierarchical model shrinks individual study estimates toward the overall mean, with the degree of shrinkage determined by the Gelman pooling factor reported in Table 5. Studies with smaller samples or noisier estimates (for example SL or MA) experience stronger shrinkage toward the pooled estimate, while large-sample studies such as GE or AC retain estimates closer to their study-specific effects.

| Study | Pooled_Mean | Post_SD | CI_low | CI_high | Unpooled | Pooling | N    | Effect_Orig |
|-------|-------------|---------|--------|---------|----------|---------|------|-------------|
| AC    | 0.107       | 0.034   | 0.045  | 0.179   | 0.124    | 0.440   | 2779 | 133257.385  |
| BL    | 0.061       | 0.071   | -0.115 | 0.183   | -0.007   | 0.757   | 280  | 32627.303   |
| SL    | 0.087       | 0.096   | -0.117 | 0.297   | 0.221    | 0.973   | 94   | 144.165     |
| GE    | 0.085       | 0.027   | 0.032  | 0.136   | 0.084    | 0.364   | 4750 | 293.444     |
| MA    | 0.097       | 0.094   | -0.088 | 0.319   | 0.304    | 0.919   | 48   | 3332.046    |
| BO    | 0.071       | 0.071   | -0.095 | 0.203   | 0.031    | 0.784   | 246  | 3332.296    |
| JL    | 0.125       | 0.106   | -0.033 | 0.410   | 0.505    | 0.878   | 84   | 332.775     |
| Ph07  | 0.046       | 0.106   | -0.237 | 0.197   | -0.322   | 0.938   | 63   | 689.674     |
| Ph10  | 0.060       | 0.103   | -0.207 | 0.236   | -0.296   | 0.952   | 34   | 3086.222    |
| AB    | 0.053       | 0.076   | -0.135 | 0.173   | -0.052   | 0.795   | 269  | 2075.909    |

Table 5: Jointly Estimated revenue Treatment Effects

| Parameter | mean  | median | sd   | 95% CI          |
|-----------|-------|--------|------|-----------------|
| Tau       | 0.080 | 0.083  | 0.05 | (-0.032, 0.173) |
| SD        | 0.071 | 0.051  | 0.07 | (0.002, 0.258)  |

Table 6: Posterior Summary of revenue Hyperparameters

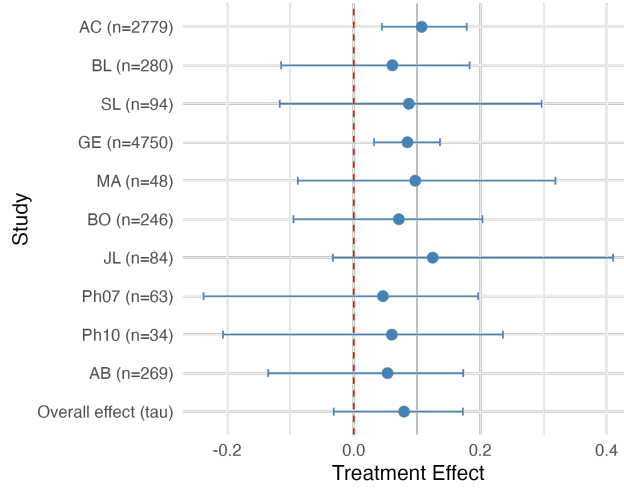


Figure 4: Revenue Treatment Effects by Study

## 5.2 Impacts on the Wage Share

We next examine whether improvements in firm performance translate into a higher share of revenue paid to workers. Table 7 reports study-level treatment effects for the wage share. The posterior mean estimates are generally small, with all but one lying between 0.02 and 0.072 standard deviations. The pooled estimate of the overall effect is  $= 0.041$ , with a credible interval of 95% from 0.063 to 0.171.

The credible interval includes zero, implying that we cannot reject the hypothesis that the wage share remains unchanged following capital injections. This result suggests that while firms may grow in response to improved access to capital, the distribution of revenue between capital and labour does not systematically change. If anything, and contrary to models where labour market power grows with firm size, the wage share increases with firm revenue.

The estimated cross-study standard deviation (0.095) indicates that heterogeneity in this parameter is slightly greater than for revenue outcomes. Most interventions appear to produce modest changes in wage share.

Taken together, these results suggest that capital interventions do not systematically alter the functional distribution of income within firms. Instead, any worker gains likely arise through expansion of the firm rather than changes in the share of output accruing to labour.

| Study | Pooled_Mean | Post_SD | CI_low | CI_high | Unpooled | Pooling | N    | Effect_Orig |
|-------|-------------|---------|--------|---------|----------|---------|------|-------------|
| AC    | 0.071       | 0.038   | -0.001 | 0.147   | 0.085    | 0.300   | 2779 | NA          |
| BL    | 0.060       | 0.080   | -0.085 | 0.241   | 0.104    | 0.676   | 266  | NA          |
| SL    | 0.095       | 0.139   | -0.099 | 0.468   | 0.694    | 0.959   | 93   | NA          |
| GE    | -0.009      | 0.030   | -0.068 | 0.048   | -0.021   | 0.228   | 4621 | NA          |
| MA    | 0.041       | 0.123   | -0.207 | 0.310   | -0.048   | 0.958   | 15   | NA          |
| BO    | 0.006       | 0.082   | -0.179 | 0.161   | -0.071   | 0.693   | 241  | NA          |
| JL    | 0.043       | 0.114   | -0.184 | 0.301   | 0.041    | 0.877   | 62   | NA          |
| Ph07  | 0.054       | 0.126   | -0.177 | 0.346   | 0.286    | 0.951   | 14   | NA          |
| Ph10  | 0.073       | 0.128   | -0.135 | 0.397   | 0.459    | 0.912   | 29   | NA          |
| AB    | 0.027       | 0.083   | -0.150 | 0.197   | -0.016   | 0.735   | 218  | NA          |

Table 7: Jointly Estimated wage div revnue Treatment Effects

| Parameter | mean  | median | sd    | 95% CI          |
|-----------|-------|--------|-------|-----------------|
| Tau       | 0.046 | 0.040  | 0.062 | (-0.064, 0.192) |
| SD        | 0.095 | 0.076  | 0.075 | (0.008, 0.295)  |

Table 8: Posterior Summary of wage div revnue Hyperparameters

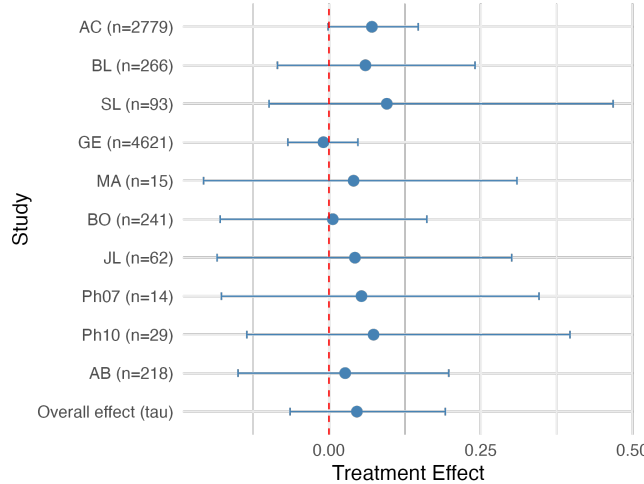


Figure 5: Wage Share Treatment Effects by Study

### 5.2.1 Impacts on the wage bill

To better underage the effect on wage share we examine impacts on the total wage bill, which directly measures the total compensation paid to workers. Table 9 reports study-level treatment effects. Unlike the previous outcomes, the estimates are consistently positive across almost all studies. Posterior means range between approximately 0.07 and 0.12 standard deviations. The pooled estimate from the hierarchical model is  $\tau = 0.153$ , with a 95% credible interval of 0.013 to 0.195, indicating a statistically meaningful increase in the total wage bill across interventions.

This result suggests that workers benefit from firm-level capital interventions through increases in total labour payments. Importantly, the estimated between-study standard deviation is relatively small (0.058), implying that these effects are reasonably consistent across settings.

Taken together with the previous results, the pattern is informative: Firm revenue increases modestly. The wage share of revenue remains roughly unchanged. The total wage bill increases. This combination of results is consistent with a scale effect: firms expand production and employment in response to capital injections, raising the total amount paid to workers without necessarily increasing labour's share of firm income.

Crucially, the positive downstream impacts on workers we have just documented would not be observable in an analysis that focuses exclusively on the extensive margin of employment. In Figure 7, we document that employment does not increase systematically in treated firms. The impacts on the wage bill thus come from increased compensation per worker. However, we are unable to establish whether this increase in compensation is due to workers being

employed for more hours or to a higher hourly wage.

| Study | Pooled_Mean | Post_SD | CI_low | CI_high | Unpooled | Pooling | N    | Effect_Orig |
|-------|-------------|---------|--------|---------|----------|---------|------|-------------|
| AC    | 0.091       | 0.031   | 0.030  | 0.155   | 0.094    | 0.503   | 2779 | 5319.060    |
| BL    | 0.115       | 0.067   | 0.008  | 0.284   | 0.209    | 0.802   | 286  | 3254.916    |
| SL    | 0.115       | 0.095   | -0.029 | 0.366   | 0.631    | 0.980   | 94   | 1.962       |
| GE    | 0.085       | 0.025   | 0.035  | 0.134   | 0.082    | 0.426   | 4732 | 59.185      |
| MA    | 0.087       | 0.081   | -0.092 | 0.258   | 0.002    | 0.941   | 48   | 450.595     |
| BO    | 0.068       | 0.060   | -0.076 | 0.173   | -0.009   | 0.778   | 383  | 176.341     |
| JL    | 0.105       | 0.082   | -0.036 | 0.310   | 0.240    | 0.915   | 84   | 129.691     |
| Ph07  | 0.105       | 0.092   | -0.051 | 0.329   | 0.703    | 0.972   | 14   | 154.984     |
| Ph10  | 0.100       | 0.086   | -0.058 | 0.306   | 0.266    | 0.962   | 29   | 167.515     |
| AB    | 0.070       | 0.066   | -0.094 | 0.185   | -0.034   | 0.829   | 269  | 423.771     |

Table 9: Jointly Estimated wage Treatment Effects

| Parameter | mean  | median | sd    | 95% CI         |
|-----------|-------|--------|-------|----------------|
| Tau       | 0.094 | 0.091  | 0.044 | (0.013, 0.195) |
| SD        | 0.058 | 0.040  | 0.059 | (0.002, 0.217) |

Table 10: Posterior Summary of wage Hyperparameters

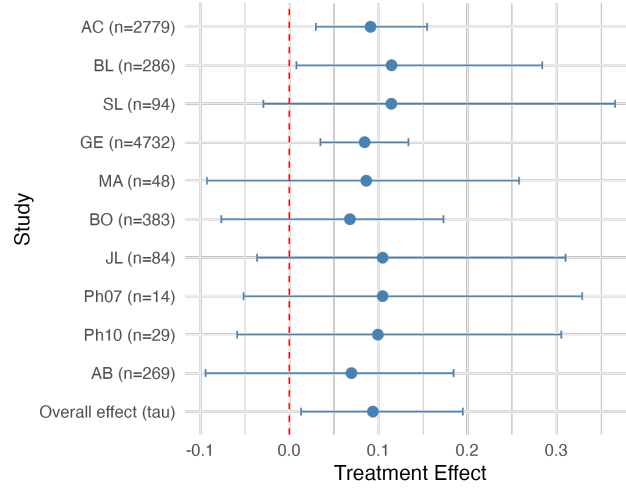


Figure 6: Wage Treatment Effects by Study

### 5.2.2 Number of Employees

| Study | Pooled_Mean | Post_SD | CI_low | CI_high | Unpooled | Pooling | N    | Effect_Orig |
|-------|-------------|---------|--------|---------|----------|---------|------|-------------|
| AC    | 0.070       | 0.037   | 0.001  | 0.145   | 0.084    | 0.251   | 2835 | 0.518       |
| BL    | 0.000       | 0.086   | -0.187 | 0.159   | -0.031   | 0.570   | 278  | 0.001       |
| GE    | 0.032       | 0.028   | -0.023 | 0.086   | 0.032    | 0.194   | 4764 | 0.276       |
| MA    | -0.037      | 0.150   | -0.411 | 0.203   | -0.289   | 0.812   | 48   | -0.021      |
| BO    | -0.066      | 0.097   | -0.278 | 0.084   | -0.162   | 0.567   | 398  | -1.106      |
| JL    | 0.111       | 0.154   | -0.122 | 0.507   | 0.424    | 0.756   | 84   | 0.233       |

Table 11: Jointly Estimated num employees Treatment Effects

| Parameter | mean  | median | sd    | 95% CI          |
|-----------|-------|--------|-------|-----------------|
| Tau       | 0.018 | 0.024  | 0.085 | (-0.173, 0.187) |
| SD        | 0.137 | 0.104  | 0.127 | (0.005, 0.467)  |

Table 12: Posterior Summary of num employees Hyperparameters

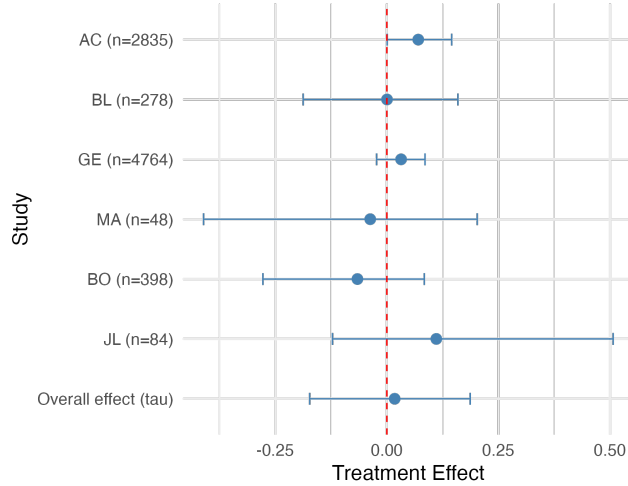


Figure 7: Number of Employees Treatment Effects by Study

## 6 Conclusion

The impact of firm-level interventions on wage growth is a key parameter for understanding how the benefits of economic growth are shared in society. Many development policies are designed to relax constraints on firms, with the expectation that stronger firm performance will also improve outcomes for workers. Yet the extent to which these gains are passed on to labour has received less systematic attention than effects on profits, revenues, or employment.

In this paper, we provide new evidence on this question through a systematic review and meta-analysis of randomized capital interventions targeting firms in low- and middle-income countries. Using firm-level data from ten experiments, we estimate treatment effects on revenue, total wage payments, and the wage share of revenue using a Bayesian hierarchical model. This approach allows us to combine evidence across heterogeneous contexts while accounting for uncertainty and cross-study variation.

Our findings suggest that workers do benefit from firm-level capital interventions. On average, these interventions increase the total wage bill by approximately 0.15 standard deviations. At the same time, we find little evidence that the wage share of revenue changes systematically. This pattern is consistent with a scale effect: capital interventions allow firms to expand production, and workers benefit through higher aggregate labour payments rather than through a redistribution of revenue from owners to workers. Put differently, firm growth appears to raise the total amount paid to workers while leaving the division of revenue between labour and other factors broadly unchanged.

These results also point to important heterogeneity across settings. Worker

gains may depend on the type of firms targeted, the structure of local labour markets, and the extent to which firms are able to expand paid employment. This is particularly important for informal and small-firm settings, where many low-income workers are employed but where the capacity for firm expansion may be more limited.

The findings have two broader implications. First, firm-directed capital interventions should not be evaluated only through their effects on firm owners. When firms employ workers, capital provision can generate downstream gains for labour, making these interventions more broadly relevant for welfare than a narrow focus on profits would suggest. Second, employment and wage data should be collected more consistently in future firm experiments. Our review shows that many otherwise relevant studies cannot be used to estimate worker pass-through because they do not measure wages, total labour payments, or worker outcomes in sufficient detail.

Overall, the evidence indicates that capital interventions can raise worker income, but primarily by increasing the scale of firm activity rather than by changing the functional distribution of income within firms. Understanding when this pass-through is strongest remains an important direction for future research, especially in informal and small-firm settings where the potential welfare gains for poorer workers may be largest.

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## 7 Appendix

### 7.1 Change in Revenue

| Study | Pooled_Mean | Post_SD | CI_low | CI_high | Unpooled | Pooling | N    | Effect_Orig |
|-------|-------------|---------|--------|---------|----------|---------|------|-------------|
| AC    | 0.185       | 0.038   | 0.109  | 0.260   | 0.195    | 0.078   | 2779 | 129062.151  |
| BL    | 0.012       | 0.101   | -0.192 | 0.203   | -0.019   | 0.364   | 280  | 7522.330    |
| SL    | 0.085       | 0.192   | -0.300 | 0.506   | 0.190    | 0.903   | 90   | 118.156     |
| GE    | 0.048       | 0.029   | -0.009 | 0.104   | 0.047    | 0.050   | 4750 | 204.915     |
| MA    | 0.190       | 0.193   | -0.131 | 0.637   | 0.515    | 0.708   | 44   | 5346.442    |
| BO    | -0.043      | 0.129   | -0.318 | 0.185   | -0.139   | 0.436   | 167  | -3636.306   |
| JL    | 0.202       | 0.173   | -0.086 | 0.593   | 0.454    | 0.644   | 84   | 30346.460   |
| Ph07  | -0.070      | 0.183   | -0.484 | 0.242   | -0.370   | 0.751   | 63   | -1037.385   |
| Ph10  | 0.114       | 0.187   | -0.247 | 0.528   | 0.309    | 0.781   | 34   | 5517.003    |
| AB    | -0.096      | 0.121   | -0.348 | 0.120   | -0.199   | 0.378   | 269  | -4445.575   |

Table 13: Jointly Estimated change revenue Treatment Effects

| Parameter | mean  | median | sd    | 95% CI          |
|-----------|-------|--------|-------|-----------------|
| Tau       | 0.064 | 0.064  | 0.090 | (-0.114, 0.253) |
| SD        | 0.195 | 0.173  | 0.108 | (0.051, 0.459)  |

Table 14: Posterior Summary of change revenue Hyperparameters

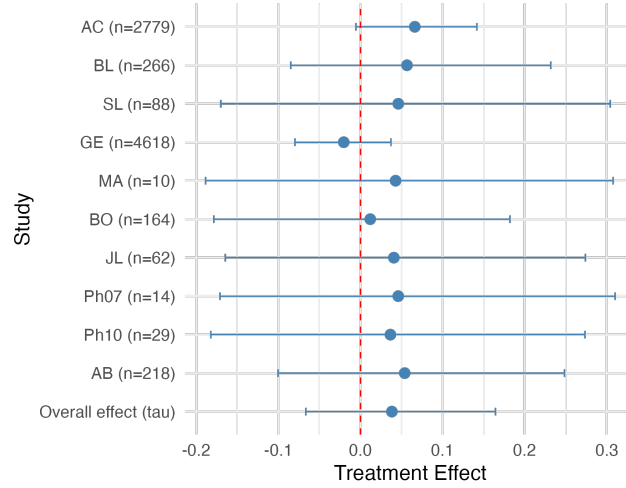


Figure 8: Change in Revenue Treatment Effects by Study

## 7.2 Change in Wage Share

| Study | Pooled_Mean | Post_SD | CI_low | CI_high | Unpooled | Pooling | N    | Effect_Orig |
|-------|-------------|---------|--------|---------|----------|---------|------|-------------|
| AC    | 0.066       | 0.038   | -0.006 | 0.142   | 0.081    | 0.292   | 2779 | 0.010       |
| BL    | 0.057       | 0.078   | -0.085 | 0.232   | 0.108    | 0.689   | 266  | 0.020       |
| SL    | 0.046       | 0.114   | -0.170 | 0.304   | 0.199    | 0.981   | 88   | 0.001       |
| GE    | -0.020      | 0.030   | -0.080 | 0.037   | -0.034   | 0.219   | 4618 | -0.094      |
| MA    | 0.043       | 0.121   | -0.189 | 0.308   | 0.258    | 0.973   | 10   | 0.018       |
| BO    | 0.012       | 0.087   | -0.179 | 0.182   | -0.064   | 0.724   | 164  | 0.042       |
| JL    | 0.041       | 0.106   | -0.165 | 0.274   | 0.072    | 0.898   | 62   | 0.038       |
| Ph07  | 0.046       | 0.116   | -0.171 | 0.310   | 0.266    | 0.957   | 14   | 0.009       |
| Ph10  | 0.036       | 0.109   | -0.182 | 0.273   | 0.020    | 0.933   | 29   | 0.002       |
| AB    | 0.054       | 0.086   | -0.100 | 0.249   | 0.110    | 0.757   | 218  | 0.008       |

Table 15: Jointly Estimated change wage div revenue Treatment Effects

| Parameter | mean  | median | sd    | 95% CI          |
|-----------|-------|--------|-------|-----------------|
| Tau       | 0.038 | 0.034  | 0.057 | (-0.067, 0.164) |
| SD        | 0.089 | 0.074  | 0.063 | (0.01, 0.249)   |

Table 16: Posterior Summary of change wage div revenue Hyperparameters

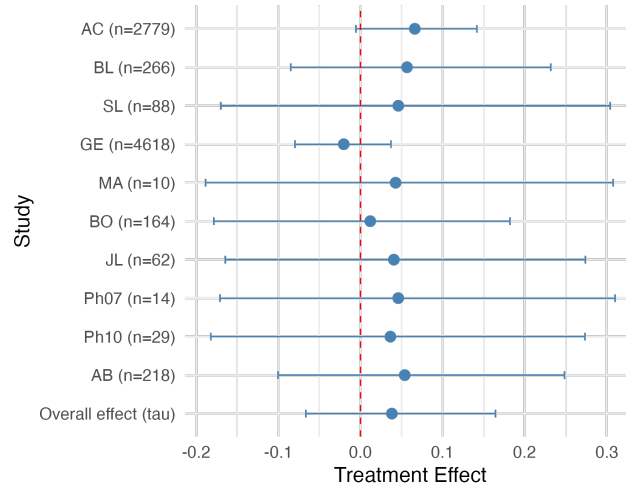


Figure 9: Change in Wage Share Treatment Effects by Study