Formalizing employment in Africa's small firms: Experimental evidence from Côte d'Ivoire[*]

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Abstract

Informal, low-quality employment in micro, small, and medium enterprises (MSMEs) remains a significant challenge in low- and middle-income countries. We present evidence from a consulting program in Côte d'Ivoire that advised firms on business management practices to show that a low-cost intervention can help improve job formality, without imposing undue financial burdens on firms. Using a randomized controlled trial with 448 MSMEs, we find that the intervention led to considerably higher overall employment formalization, driven in particular by greater reported minimum wage compliance and an increase in written contract provision. Drawing on a unique matched employer-employee dataset collected at three time points, we show suggestive evidence that these improvements were not driven by worker turnover or selection effects, but rather by employers' increased recognition of formalization's benefits. The intervention's financial implications were moderate, with evidence suggesting firms partially formalized previously informal payment streams, without a significant increase in total labor costs.

JEL Classification: O12, O17, J46, J81

1   Introduction

Employment in small enterprises in low- and middle-income countries (LMICs) is often informal, with workers and firms not complying with all or certain aspects of labor regulations and social security regulations (ILO, 2023). Although informal work arrangements offer potential benefits to both employers and employees (Günther and Launov, 2012; Maloney, 1999, 2004; Ponczek and Ulyssea, 2022), they are generally considered undesirable. From an employee's perspective they often deprive workers of fundamental employment protections, including economic security, social benefits, and legal safeguards. Moreover, from a societal perspective the prevalence of informal employment threatens the sustainability of social security systems, erodes the tax base, and correlates with broader economic inefficiencies, particularly reduced labor and firm productivity (Basu *et al.*, 2010; Badaoui and Walsh, 2022; Benhassine *et al.*, 2018; World Bank, 2016). While some interventions have been successful at formalizing employment (Jessen and Kluve, 2021), doing so leads to higher costs for firms and therefore often results in reductions in employees' real wages, lay-offs, or firm exits (Bedi *et al.*, 2022; Karlen *et al.*, 2023; Ulyssea, 2018, 2020), raising the question of whether governments should undertake additional efforts at all to reduce informality (Benhassine *et al.*, 2018; Bruhn *et al.*, 2018).

In this paper we present evidence from a light-touch business-consulting intervention that aims at employment formalization without inducing adverse firm and employment outcomes. The rationale behind the intervention was twofold. First, given robust evidence that business trainings and consulting lead to moderately positive, average effects on productivity and profits (McKenzie, 2021), employment formalization may be a result of improved management practices. Second, the implemented intervention puts a strong focus on HR management practices. In particular, the business consulting activities were aimed at increasing employers' awareness that formalizing employment relationships does not only involve costs but also represents opportunities for higher long-term profits. For example, employers were made aware that paying higher salaries or social security benefits might attract more talented individuals and help retain more productive employees.

The setting of our study is an impact evaluation with micro, small, and medium enterprises (MSMEs) in Côte d'Ivoire. In total, 448 MSMEs were randomized into one control (N=186) and one treatment condition (N=262) with the latter group being enrolled in a business consulting intervention operated by the country's MSME agency (CI PME).[1] The consulting intervention involved (i) an initial firm-level diagnostic and (ii) at least one personal visit by a professional

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[1] In an accompanying paper (Lakemann *et al.*, 2024) we dissect firm-level financial performance outcomes more closely.

consultant in which advice focused on financial and human resource management practices. Additionally, management staff in treatment group firms were offered free access to a series of twelve webinars in which speakers provided insights into strategic decision-making in the fields of financial and human resource management.

Our principal outcomes of interest relate to key aspects of employment formality, namely (i) payment of at least minimum wages, (ii) issuing of written work contracts, and (iii) social security registration. Based on matched employer-employee survey data that we collected at three points in time, at baseline and six to eighteen months after the intervention, our analysis proceeds in four steps. First, we illustrate that rates of employment formalization tend to be relatively low. Many employment relationships lack key elements of formality: At baseline, 53% of workers lacked written contracts, and 61% were not registered with the public social security provider. Minimum wage compliance was relatively high, with only 16% of employees earning below the minimum wage.

Second, and relying on ITT and LATE specifications, we show that at the employee level the intervention led to a positive and substantively meaningful impact on employment formality. In comparison to the control group, employees in treated firms score significantly higher on an index of job formality, reflecting a higher share that receives at least the minimum wage (a difference of 11 percentage points, or 15% relative to the control mean, at the end of our study), have written work contracts (7 pp higher, or 13%), and are registered at social security (3 pp, or 7%, although this constituent effect by itself does not reach statistical significance in any of our estimations). In addition, we find that employees in treatment firms report 14% higher monthly wages at endline. The significant increase in wages can be observed across much of the wage distribution. Our main results – greater formality, driven by reported minimum wage compliance and written contracts, as well as higher reported wages – largely persist across a battery of robustness checks such as different weighting methods and adjustments for multiple hypothesis testing.

Next, we aim to shed light on the mechanisms driving the observed impacts on formality and wage reports. Our analysis focuses on four main channels. First, we investigate whether improvements in firm performance enabled formalization. We find that firms implemented greater employment formality without significant changes in profits. Second, we explore selective formalization as an HR management tool, and in particular whether employers used job formality measures to attract or retain talent. We find mixed evidence. While employers improved conditions for valuable workers, we see no differences in workforce composition. Third, we assess whether increased awareness of regulations drove compliance, finding that while knowledge im-

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provements about the rules and regulations played a role, particularly among initially less compliant firms, the increased knowledge did not seem to translate into greater fear of enforcement. Fourth, we investigate whether improved formality reflects reductions in informal side-payments. We find that treatment firms showed lower rates of informal (i.e. under- or unreported) wage payments compared to control firms (20% vs. 32%), which suggests that the intervention helped formalize existing payment streams instead of raising firms' de facto overall wage bill.

Our paper advances the relevant literature in three ways. First, we add to the literature by looking at the intensive margin of formality.[2] The vast majority of research studying formalization interventions focus on the extensive margin, such as self-employment or business registrations (Benhassine *et al.*, 2018; Bosch Mossi *et al.*, 2015; Campos *et al.*, 2023; de Andrade *et al.*, 2016; De Giorgi and Rahman, 2013; De Mel *et al.*, 2013; Galiani *et al.*, 2017; Grimm *et al.*, 2024; Hoy *et al.*, 2024; Rocha *et al.*, 2018; Zucco *et al.*, 2020). We belong to the relatively smaller number of studies investigating informal employment within already formal firms (Cisneros-Acevedo, 2022; Samaniego de la Parra and Fernández Bujanda, 2024; Ulyssea, 2018).

In this context we substantially differ from related studies in terms of (i) measurement and (ii) intervention type. To the best of our knowledge related studies were not yet able to leverage matched employer-employee data to cross-validate outcome measures. In a setting where administrative data is notoriously incomplete and in which employers tend to misreport central employment indicators (Clemens and Strain, 2022; Feinmann *et al.*, 2022), verifying information on wages, work contracts, and social security enrollment is essential. In this regard we show that our main results hold across both employer and employee surveys. Concerning our intervention type, we borrow inspirations from the general business training and consulting literature (McKenzie, 2021), and evaluate a distinct multipronged policy approach. Employers may use employment formalization as a tool to boost labor productivity and firm performance when the expected benefits outweigh the associated costs. We show that such an intervention is able to achieve employment formalization at no apparent adverse effects to employers and employees, at least in the short- to medium-run.

Second, we speak to the broader labor market literature that explores outcomes using matched employer-employee datasets in LMICs. In recent years a number of studies have leveraged such datasets to shed light on within-firm wage inequality (Alvarez *et al.*, 2018; Bassier, 2023; de Melo, 2018), job flows and turnovers (Gong *et al.*, 2004; Shiferaw and Söderbom, 2023), and assess the impact of policy reforms (Bedi *et al.*, 2022). In contrast, we use these data to study

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[2]We follow Ulyssea (2018) and distinguish between the extensive and intensive margin of formalization. While the former refers to firm formalization (business registration), the latter refers to employee formalization in already formally operating firms.

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a separate intervention type (business consulting) with a different objective (increase formalization of employment) and sub-group analysis (socio-demographic and professional background characteristics).

Third, we add to the literature on employment quality. With MSMEs accounting for about 64% of total private sector employment in Sub-Saharan Africa and 91% in lower-middle income countries (World Bank and IFC and SME Finance Forum, 2019) their vital role in fighting poverty, inequality, and improving well-being is widely acknowledged and reflected, among others, in international initiatives such as the ILO's Decent Work Initiative (ILO, 2017) and the UN's Sustainable Development Goal #8 on Decent Work and Economic Growth (United Nations, 2015). In this context, a vast literature in economics has studied the impact of policy changes related to minimum wages and social security contributions (for discussions of the literature see Aşık et al. (2022); Bhorat et al. (2017); Clemens (2021); Dinkelman and Ranchhod (2012); Meer and West (2016)) on workers' earnings and employment status. In contrast, our study focuses on an intervention that (i) aims to increase compliance with existing policies and (ii) explores employment quality indicators that are closely linked to the ILO's decent work indicator framework (ILO, 2013) and go beyond wage and social security registration.

The remainder of the paper is structured as follows. Section 2 describes the experimental design. Section 3 shows the empirical strategy, main results and robustness checks, and Section 4 sheds light on potential mechanisms explaining our results. Section 5 concludes.

2 Experimental design

2.1 Institutional context

Côte d'Ivoire, a lower-middle-income country in West Africa, continues to face challenges in its labor market despite sustained economic growth averaging 6.5% between 2021 and 2023.[3] While the employment ratio in the working-age population has increased following strong economic growth, most jobs remain informal (World Bank, 2023), with most wage employment being in small firms (Christiaensen and Premand, 2017). Recognizing these challenges, the national development strategy for 2025 sets targets to reduce informal employment, increase the employment ratio, and improve working conditions (Ministère du Plan et du Développement, 2021).

The country's labor market operates within a relatively stringent regulatory framework. Côte d'Ivoire ranks 112th (of 181) globally in employment protection legislation, positioning it

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[3]Pre-pandemic growth rate averaged 8.2% between 2012 and 2019.

in the mid range among West African countries (Diallo and Ronconi, 2024; Kanbur and Ronconi, 2018).[4]

Côte d'Ivoire mandates a minimum wage (MW), which was increased to FCFA 75,000 ($\approx$ USD 139) in 2022 after remaining at FCFA 60,000 ($\approx$ USD 111) for nine years.[5] Employers are legally responsible for paying and adjusting wages accordingly. The World Bank's business-ready project estimates that the current minimum wage structure does not significantly constrain business operations, with Côte d'Ivoire scoring near the maximum on the flexibility scale.

Written employment contracts are not obligatory and verbal contracts are legally binding, but certain employment arrangements – particularly fixed-term and temporary work contracts – require written documentation. This requirement creates an important link to both minimum wage enforcement and social security registration, as written contracts provide clear evidence of employment terms and obligations. Less than 40% of wage jobs are covered by a written contract.[6]

Social security registration of their employees is compulsory for private sector firms, and employers are required to do so within 30 days of employment commencement. The Caisse Nationale de Prevoyance Sociale (CNPS) provides old-age pensions, child benefits and maternity cover, as well as insurance for workplace accidents and occupational diseases. Contributions amount to 22-25% of the monthly salary, including 6.3% paid by employees for old-age pensions. The total number of contributors stood at 830.000[7] in April 2021, corresponding to less than 10% of the labor force.[8]

The enforcement system operates through two primary detection channels: employee complaints at labor tribunals and regulatory inspections. While labor tribunals tend to strengthen employees' rights even in cases where there is no written contract, worker complaints are relatively rare, especially for vulnerable and less educated workers (Blackett and Koné-Silué, 2019). Inspections are conducted by three separate regulatory bodies focusing on general tax compliance, labor and safety standards, and the CNPS for social security registration. According to anecdotal evidence, there is minimal communication between these inspection authorities. A crucial aspect of this system is that inspections generally occur only in firms that are registered

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[4]According to World Bank data, relatively stringent firing procedures significantly contribute to Côte d'Ivoire's high labor market rigidity score. The labor code specifies three channels for employment termination: dismissal for personal reasons, dismissal for economic reasons, and negotiated termination. These procedures become increasingly complex with firm size and formalization, requiring notice periods ranging from 8 days to 4 months and severance pay between 30% and 40% of monthly salary.

[5]This minimum wage applies to all sectors except agriculture.

[6]Based on data from the ENSETE National Employment Survey reported in Christiaensen and Premand (2017).

[7]According to the Minister for Employment and Social Security, Adama Kamara, quoted in Barro (2022).

[8]In 2021, Côte d'Ivoire had an estimated labor force of 8,875,905 persons, according to the World Development Indicators. Out of this total, about 240,000 are public sector employees (Ministère de l'Économie et des Finances de la Côte d'Ivoire, 2020) who are covered by a separate social security scheme.

with the respective authority: firms only appear in the CNPS registry after registering their first employee, meaning that firms with no registered employees have a lower likelihood of inspection due to their absence from the CNPS registry. Relatedly, and in contrast to its stringent employment protection legislation, the inspection probability in Côte d'Ivoire is low.[9]

To summarize, a legal framework for labor formalization exists in Côte d'Ivoire. Yet the country faces large gaps in compliance despite the effort to increase enforcement of the legal framework. In addition, the decision to formalize a worker often rests entirely with the employer.

2.2 The intervention

The Programme d'Appui à la Productivité des PME (PAP-PME) is a consulting program implemented in Côte d'Ivoire by the public SME agency CI PME from 2019-2021, with funding from German Development Cooperation. The program had two primary objectives: (i) enhancing firm productivity and (ii) fostering job creation and improving employment conditions. Our evaluation covers the third cohort of the program, which focused on financial management and Human Resources (HR) management.

The PAP-PME consisted of individual consulting sessions delivered over the course of six months and a series of twelve webinars featuring external speakers. The consulting component was implemented by five Ivorian consulting firms. Based on an in-depth diagnostic of the firm, consultants created a structuring plan with recommendations for improvement, which were then discussed with the firm's managers. In the following, the consultants were tasked to support firms in implementing recommendations, as well as provide tools, information or contacts to the firms as required. The number of visits was not predefined and thus varied by firm and consultant. Roughly 60% of the firms received at least two, and around 30% received more than two visits (Figure A.2A).

HR management, especially employment formalization, was an important part of the program, with webinars on employee motivation, social security, and work contracts. When the consultants received the details of their assignment, CI-PME management highlighted the program objectives, with emphasis on the formalization of employment. Correspondingly, the most common recommendation given to firms concerned the formalization of employment through three main components: paying at least the minimum wage, implementing written contracts, and ensuring social security registration (see Figure A.2B). To motivate employers to implement these recommendations, consultants shared the best practice of emphasizing the benefits of em-

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[9]The combination of stringent legislation and low inspection intensity is typical of francophone West Africa, as shown by Diallo and Ronconi (2024). Côte d'Ivoire had 3.38 labor inspectors and conducted 25.6 inspections per 100,000 workers in 2020, a fraction of the world averages. Note that these figures only cover the labor inspection, not the CNPS.

ployment formality. An important argument was that providing higher-quality employment can improve employee loyalty and productivity, thus helping to break a vicious cycle of low formality, high employee turnover, poor performance, and issues such as lack of loyalty, misbehavior, and irresponsibility – which they described as key challenges in Ivorian SMEs.

2.3   Theory of change

We assess the potential effects of the PAP-PME on employment formalization in the framework of a cost-benefit analysis by employers (Ulyssea, 2018). Employers choose the level of formality they would like to offer to an employee weighing the expected costs of compliance (e.g. administrative costs, taxes, social security) and non-compliance (e.g. fines) against the respective benefits of compliance (e.g. better access to finance and markets if employees are formally employed, employee loyalty and productivity) and non-compliance (e.g. avoidance of taxes, fees and contributions, more flexibility). A firm may provide some elements (for example, minimum wages) of employee formalization but not others (for example, social security). Each element of formality – minimum wages, written contracts, social security – entails its own package of costs and benefits. Furthermore, the employer may provide different elements, i.e., degrees of formality, to different employees within the same firm.[10]

Let us consider this cost-benefit calculus for firms with different characteristics. Larger firms are expected to provide higher degrees of formality for their employees, as the potential benefits, in particular access to formal markets and finance, are more central to them. Further, the probability of non-compliance being detected and being fined rises in firm size (Ulyssea, 2018). Lower-productivity firms that operate with low-profit margins can be expected to be more sensitive to costs associated with formal employment. Within the same firm, we expect employers to provide more elements of formality to employees who are especially valuable to the firm and more difficult to replace. Finally, formalization decisions are likely to be taken without complete knowledge of labor regulations and the associated costs, in particular among less educated employers. This may lead to non-compliance because of a lack of awareness or because costs are overestimated or benefits underestimated. In this framework, we think of the intervention to cause an increase in employee formality through several mechanisms.

Firm performance
First, the objective of the treatment was to boost firm performance and productivity through improvements in financial and HR management. Higher employment formality may thus be

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[10]Whether the offer of a more formal contract is accepted by an employee depends on his or her willingness to accept. However, the intervention we consider here targets the employer and his or her decision.

a consequence of improved firm performance achieved through improvements in management practices, which allows employers to formalize. Second, employers may use employment formalization as a tool to boost labor productivity and firm performance, implying that the expected benefits of formality compensate for the associated cost increase. Under the firm performance and productivity channel, we expect the treatment to lead to increases in firm performance, labor costs, and potentially labor productivity.

Selective formalization

Second, we expect the treatment to improve HR management, using selective formalization as an instrument. Treated employers may selectively formalize elements of employment relationships with certain workers that they would like to retain or attract. More formalization in treated firms may also be driven by a mere workforce composition effect if the treatment induces firms to hire different "types" of workers, for example, more skilled workers, without necessarily changing formalization practices.

Regulatory awareness

Third, the intervention aimed to improve employers' awareness of employment protection laws and their obligations, for example, the level of the mandatory minimum wage, the potential benefits of setting up a written contract, and the procedure of registering employees for social security. This would imply treatment effects for firms with lower baseline awareness. The increase in awareness potentially also heightened the fear of inspection and potential fines. While the program did not explicitly focus on enforcement, discussions of labor regulations might have made the costs of non-compliance more salient to employers. This could include both direct costs (fines) and indirect costs (reputational damage, loss of business opportunities) of having parts of their workforce employed informally. Because larger firms have a higher latent probability of detection, we would expect this mechanism to be more salient for these firms.

Reducing informal side-payments

Fourth, we pay particular attention to a specific practice: informal side-payments (or "payments under the table" paid on top of a formal payment), which we show to be common. Formalizing such payments is a relatively cheap way to reduce informality because there are no substantial additional fixed costs attached, as the employees are already registered and receive a formal wage.[11] While the treatment did not target informal side-payments specifically, it may still have motivated employers to become fully compliant and thus offer higher social security coverage to employees.

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[11]Note that employers do need to pay higher social security contributions due to a higher contribution base resulting from the formalization of informal payments.

2.4 Recruitment and randomization

Applications for the PAP-PME opened in March 2021. 576 firms applied to the program, of which 503 fulfilled the eligibility criteria of at least one year of firm existence and at least one full-time employee in addition to the owner. Of those 448 firms participated in our baseline survey in April and May 2021. 247 firms[12] were randomly selected to participate in the treatment after stratifying by the number of employees, annual revenues, the share of female staff, and the firm district.[13] Each of the five consulting firms was randomly assigned 50 firms. During the first months, 15 firms dropped out of the program and were randomly replaced with firms from a waiting list selected using the same randomization procedure as described above.[14]

2.5 Data collection and quality

Data structure   Baseline data were collected in April/May 2021 from 448 firms that applied to the PAP-PME program and met minimum eligibility criteria. In addition, we conducted 1,593 individual interviews with employees of these firms.[15] We thus have firm-level and employee-level information. The employee dataset covers contract situation, social security affiliation, salary, working hours, and working conditions, including paid leave and job satisfaction. The firm dataset contains information on revenue, profits, costs, HR practices, as well as detailed information about staff including contract status, wages, and CNPS affiliation. This matched employer-employee structure has several advantages. First, we look at the question of how a consulting program targeting firms impacted employment formality, using information reported directly by the firms' employees. Second, by combining detailed employee-level data with additional insights about firms and their owners (such as employers' knowledge of Ivorian labor contracts and firms' profits and labor costs), we look at the underlying mechanisms driving these outcomes. Finally, the data structure allows for cross-validation of key employment variables.

Reporting reliability   While structured interviews are common practice in developing countries, data quality concerns persist, particularly regarding benefit provision. Employers may overstate benefits due to social desirability bias, legal requirements, or social norms. The litera-

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[12]The treatment group is larger than the control group as there were 250 spots to be filled. We exclude 3 treatment group firms and one control group firm from our analyses as they were found to have been closed throughout the entire study period.

[13]We used the average from 2018 to 2020 for the number of employees, annual revenues and the share of female staff. Firm size categories: up to 3, more than 3 and up to 6, more than 6; annual revenues categories: less than 20M FCFA, 20M FCFA or more, no information; share of female staff categories: up to 25%, more than 25%.

[14]In total the waiting list consisted of 30 firms, and non-selected firms remained in the control group. All waitlisting was blind, in the sense that firms do not know that they were waitlisted.

[15]For firms with up to 10 employees, all staff members were interviewed. For larger firms, we employed stratified random sampling: ten staff members were selected based on the initial letter of their first name, stratified by supervisory responsibility. In the follow-up surveys, we interviewed all employees from the baseline survey plus up to 5 new employees (again, selecting randomly if there were more than 5 new employees).

ture documents such biases through under-reporting of sensitive behaviors like illicit drug use or alcohol consumption (Larson, 2019; Tourangeau and Yan, 2007), and over-reporting of socially desirable behaviors like voting or exercise (Larson, 2019). Employee reporting likely contains fewer biases since the confidential interview procedures were made clear and incentives to over-report are lower for employees than for employers, though some may over-report benefits out of employer loyalty. We will, therefore, use the employee-reported data for our main analysis.

Nevertheless, our matched employer-employee data structure allows for systematic verification of reporting consistency. Table A.7 shows reporting discrepancies between firm owners and employees at baseline. For wages, 64% of statements match, with employees reporting higher wages in 17% and employers reporting higher wages in 18% of cases. For written contracts, 80% of the statement match, with an equal 10% discrepancy rate for both employer and employee reporting (Table A.7). For social security affiliation, we find that 73% of the statements are consistent, with employers reporting higher affiliation in 11% and employees reporting higher affiliation in 16% of the cases (Table A.7).[16]

Analysis by firm characteristics reveals that reporting consistency differs by some firm characteristics.[17] Nevertheless, while we observe discrepancies between firm and employee data at baseline, we find no evidence of systematic misreporting by either side. The balanced nature of discrepancies suggests that our data suffers some degree of measurement error rather than strategic misreporting behavior.

2.6 Balance and attrition

Balance We conduct balance checks with the baseline sample. Since randomization and treatment happened at the firm-level, we first look at balance using the firm data. Table A.3 shows that we cannot see any systematic differences between treatment and control groups concerning outcome and strata variables as well as other firm characteristics. At the employee-level, baseline values are also balanced between treatment and control groups for both outcome variables and employee characteristics (Table 1), even though randomization happened at the firm-level.

Baseline characteristics Baseline characteristics of employees show that 47% of employees have a written contract, and 39% are registered with the social security provider CNPS. The

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[16]For social security contribution data, the comparison requires grouping firm-level and employee-level data into three categories due to no employer reported information on individual registration status but rather the overall share of registered employees.

[17]Wage consistency drops to around 55% in firms with over six employees, with employers reporting higher wages. Contract consistency is lower in firms with 4-6 employees. Larger firms show lower social security consistency.

average monthly wage is FCFA 140.000 (around USD 260), with 84% earning at least the minimum wage of FCFA 60.000 (around USD 111) and respondents work an average of 43 hours per week. The average age of the employees was around 34 years, 65% were male, around half of the employees were married at baseline and 52% had tertiary education. 39% of the sample have some supervisory responsibility, with an average of 3.5 persons supervised. Respondents have an average experience of six years in the sector and have spent 3.8 years in the firm where they currently work (Table 1). In line with our Theory of Change in Section 2.3 we see that employment formality is higher among workers that are potentially more valuable to firms, such as employees with tertiary education and supervisory responsibilities (Table A.5).[18] In addition, formality and its individual components show consistently higher levels in larger firms and in firms where employers report greater baseline knowledge about the Ivorian labor code (Table A.8). Finally, we see that individuals without personal relationships with their employers are more likely to be formal at baseline (Table A.5).

The firm-level baseline data shows patterns regarding the distribution of benefits. A majority of firms (70%) pay all employees at least minimum wage, while only 10% pay below minimum wage to all workers. Written contracts show an opposite pattern: 53% of firms provide no contracts, while 32% offer contracts to all employees. Social security registration presents a more varied distribution: 20% of firms register all employees, 34% register none, and 46% register a portion of their workforce (Table A.6).

Take-up Firms that received two or more visits from the respective consulting firm were classified as "having received the treatment". The underlying reason for this classification is that consultants finalized their diagnostic during the first visits, whereas concrete recommendations were made during additional visits. As shown in Table A.3, there are some significant differences for some firm characteristics between firms who did and did not take up the treatment. Micro-enterprises with revenues below FCFA 30 million were, for example, more likely to take up the program, whereas small enterprises with revenues between FCFA 30 and 150 million were less likely to participate in the program.

Attrition We were able to re-interview 386 firms after six months of treatment and 360 firms after 18 months of treatment. For the employee-level follow-up survey in mid-2022 and mid-2023, we targeted 1,848 and 1,565 respondents, respectively, in MSMEs that continued to be

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[18]More formality is provided to employees who are older, more educated, and more experienced, as well as those in supervisory positions.

part of the firm sample.[19,20] Out of those, we were able to interview 1106 employees in 2022 and 1055 in 2023.[21] The 2022 sample consisted of 821 respondents who remained employed at their respective firms, 161 employees that joined the firm after the baseline data collection and 124 who had left since the baseline survey. In 2023, we interviewed 738 current employees that have been interviewed in the previous wave, 175 employees that had left their firm, and 145 new employees.

The primary reason for employee attrition was refusal to participate. The second most common cause was employees being unreachable. While we prioritized conducting in-person interviews, we attempted to reach employees not present at the company building at the point when conducting the firm interview via telephone. However, reaching employees via phone was sometimes impossible due to changed phone numbers.[22] In some cases, employers withheld permission for us to interview specific employees.

While individual characteristics are balanced between the treatment and control group at baseline, we see that attrition caused slight imbalances concerning secondary and tertiary education (Table A.1) which we will consider in our analysis.

3 Results

3.1 Empirical strategy

In our main specification, we estimate the intention to treat (ITT) effects at the employee-level using an ANCOVA specification:

$$y_{ift} = \beta_0 + \beta_1 A_f + \beta_2 y_{ift_0} + \beta_3 M_{ift_0} + \beta_4 S_f + \beta_5 C_{it_0} + \beta_6 E_{ft} + \phi_{ift}, \tag{1}$$

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[19]The primary reason for firm attrition six months after program implementation was firm refusal, followed by firm closure. Firm owners' refusal to participate in the second round of interviews was mainly due to disappointment with the program, as they expected financial support, even though it was clarified from the beginning that such support would not be available. After 18 months post-implementation, the main reasons firms could not be re-interviewed were firm closure (10 firms) followed by refusals (8 firms). We suspect most firms disappointed by the program had already dropped out during the midline data collection, which explains the lower number of refusals in 2023.

[20]Note that the targeted employee sample is larger than the initial employee sample since we also targeted workers that declared to be an employer in wave 1 and new employees that joined the firm between waves of data collection.

[21]Apart from our initial respondents, we interviewed new employees who joined the company since the baseline assessment. When the number of new employees was equal or below 5, we aimed to interview all new employees. In situations with more than 5 new workers, we adopted a simplified random sampling procedure to select and interview 5 respondents.

[22]During the baseline and mid-line interviews, enumerators called phone numbers of employees when the interview was done in presence in order to assure that the phone number was correct. In addition, we collected phone numbers of friends or relatives in order to maximize the chance to reach the respective employee during the follow-up survey.

where y_{ift} is the outcome of interest for individual i working in firm f at time t. We measure the effect at $t = 6$ months after the treatment and $t = 18$ months after the treatment. In addition, we pool both waves to estimate an overall pooled treatment effect. A_f is assignment to treatment of firm f in which individual i works, y_{ift_0} is the baseline value of the dependent variable, and M_{ift_0} is a dummy variable equal to one if the baseline value of the dependent variable is missing. S_f is a vector of variables used in the stratified randomization[23] discussed above. In addition, we control for the baseline education level of employees due to imbalances caused by attrition (C_{it_0}) (see Section 2.6) and include enumerator fixed-effects to account for potential experimenter demand bias (E_{ft}). Finally, the error term is ϕ_{ift}. We cluster standard errors at the firm-level. For all employee-level results we exclude employers.

Our main outcomes of interest are an indicator for whether the respondent reports earning at least the minimum wage, an indicator for whether the respondent reports having a written contract, an indicator for whether the employee reports being affiliated to CNPS for social security through the current employer, and a formality index, measured as the average of the previous three indicators.[24]

Other outcomes of interest going beyond employment formality are log monthly wages in 1000' FCFA, weekly hours worked, training participation (a dummy variable equal to 1 if an individual participated in any training in the past year and 0 otherwise), job satisfaction (a dummy variable equal to 1 if an individual is satisfied or very satisfied and 0 otherwise) and employee retention (a dummy variable equal to 1 if an employee left the firm at the end of the year and 0 otherwise). Finally, we look at outcomes at the firm level, such as labor costs and firm profits.

For the latter set of outcomes at the firm level, we estimate Equation 1 at the firm level:

$$y_{ft} = \beta_0 + \beta_1 A_f + \beta_2 y_{ft_0} + \beta_3 M_{ft_0} + \beta_4 S_f + \beta_5 C_f + \beta_6 E_f + \epsilon_{ft}, \tag{2}$$

where y_{ft} is our outcome of interest for firm f at time t. Again, A_f is the treatment assignment, y_{ft_0} is the baseline value of the dependent variable, and M_{ft_0} is a dummy variable equal to one if the baseline value of the dependent variable is missing. S_f is a vector of variables used in

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[23]Stratification made use of the following variables: (i) location (the economic capital Abidjan vs. the rest of the country), (ii) average annual turnover 2018-2020, and (iii) average number of employees 2018-2020. We opt for this approach (as opposed to including lower administrative level spatial fixed effects) to reap the benefits of stratification in terms of estimation efficiency while avoiding the loss of too many degrees of freedom. The share of female employees, which was used in stratification following our implementation partner's suggestion, is excluded from the analysis as it has little influence on the outcomes of interest.

[24]We use the firm data set to mimic our outcomes using employer reported benefits. Here, our outcomes are defined as (i) the proportion of employees earning above the minimum wage, (ii) the proportion of employees with a written contract, (iii) the proportion of employees affiliated with social security, and (iv) simple index of employment formality, which consists of the average of those three subcomponents.

randomization, C_f are variables not balanced due to attrition (firms sector), E_f are enumerator fixed effects, and ϵ_{ft} is the error term. We use robust standard errors to account for unobserved heterogeneity. The ITT estimate is then given by the coefficient β_1.

We also estimate the average treatment effect for compliers. We use a dummy for program take-up, which is defined as receiving at least two consultant visits (see Section 2.6). Estimating the local average treatment effect (LATE) for firms and individuals working in firms that took up the consulting, controls for the fact that not all firms registered to receive consulting support actually received it.

Finally, we explore multiple dimensions of heterogeneity using interaction models to better understand how the effects vary across different subgroups and characteristics of our sample. We focus on firm and employer characteristics – such as firm size, firm location or baseline knowledge of employers – as well as employee characteristics – such as the status of an employee (new vs. old), the experience level of an employee or the level of satisfaction at baseline.

3.2 Main results

Formality Panel A of Table 2 reports the ITT effects based on estimating Model 1 as well as LATEs for our main outcomes: earning at least the minimum wage, having a written contract, being registered with social security and our formality index. On the formality index, employees of treatment group firms scored 6 and 7 index points higher than employees of control group firms at six and 18 months after the consulting intervention, respectively. These effects on employment formality are driven by an increase of 11 pp in the likelihood of receiving at least the minimum wage eighteen months after the treatment,[25] equivalent to 15% of the control mean of 73%, and an increase of 7 pp in the likelihood of having a written contract at six and 18 months after the treatment, equivalent to 13% of the control mean of 53% and 54%. The effect on written contracts is initially driven by fixed-term rather than permanent contracts (Table A.9), but after 18 months is equally attributable to increases in both types.[26] Treatment effects on being registered for social security are small and insignificant (Table 2). As we would expect, the LATEs reported in the bottom half of Panel A are larger for all outcomes, sometimes substantially so. For example, employees in treatment-assigned firms that were actually exposed to treatment are 17 pp more likely to earn at least the minimum wage.

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[25]Notably, between the two follow-up survey waves, the minimum wage in Côte d'Ivoire increased from FCFA 60,000 to FCFA 75,000. The effect we find 18 months after the treatment is attributable to a decrease in the control mean, indicating that workers in control firms have a lower probability of receiving at least the minimum wage after the minimum wage increase.

[26]Fixed term contracts automatically convert to permanent contracts after two years in Côte d'Ivoire.

3.3 Additional Results

Wages   Looking beyond the binary indicator for minimum wage compliance, we find positive treatment effects on wages after 18 months, with employees in the treatment group earning 14% higher monthly wages than those in the control group (Panel B of Table 2). A quantile regression shows that the treatment effects are positive for all deciles, mostly significant, and largest at the 70th percentile (Table A.10), indicating that the treatment benefited not only low-wage workers who were more likely to gain minimum wage compliance, but also those in upper wage brackets.

Satisfaction, working hours, and training   We do not find any significant average effects on additional outcomes including employee satisfaction, working hours, and training participation (Panel B of Table 2).[27] While one could suspect that improvements in employment formality might go together with greater job satisfaction, both short- and medium-term treatment effects on satisfaction are close to zero. As job quality rises, perhaps so do employee expectations.

Retention   Our analysis reveals no significant differences in employee retention between treatment and control firms. As shown in Panel C of Table 2 approximately 12% of employees in control firms leave the firm within six months of the treatment, and 19% have left by the 18-month mark. However, being employed in a treatment firm does not impact these turnover patterns on average: workers in treatment firms are similarly likely to quit their job voluntarily, and their risk of being laid off remains comparable to those in control firms. When examining heterogeneous effects in Table A.17, we find that employees in larger treatment firms (those with more than 6 employees) are more likely to exit their job than those in relevant control group firms.

3.4 Robustness

We next summarize several robustness checks, with detailed results available in the Online Appendix: We report estimates that take into account multiple hypothesis testing and sample attrition, and we assess to which extent our employee-level results are consistent with available employer reports.

Multiple hypothesis testing   One concern is that some of the observed, significant results may be due to chance as we estimate effects on a number of outcomes. Our primary focus on the formality index as a singular measure of key variation should alleviate this concern to some extent. In addition, we calculate sharpened *q*-values as proposed by Benjamini *et al.* (2006),

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[27]Measuring the effect on working hours might be challenging since it is unclear if a decrease in working hours (potentially less overtime) or an increase in working hours (less underemployment) can be interpreted as a desirable effect.

shown in Panel A of Table A.13, where we count all primary and secondary outcomes, including the formality index and its distinct components, as part of a set of multiple tests. We see that results for the formality index remain significant at the .10 level at 18 months and in the pooled analysis, with effects on wages and minimum wage compliance at either the .05 or .10 level in these analyses. The effect on written contracts, the most tentative finding in Table 2, remains significant only when we use all available outcome data in the pooled analysis.

Attrition   Another concern is that the estimated treatment effects may be biased due to attrition. We think this is unlikely to be a major problem for three reasons. First, we observe no differential attrition across treatment and control groups. The baseline share of employees in treated firms (62%) is virtually identical to the share in treated firms among baseline observations that remain in the final wave eighteen months after the intervention (61%). Second, our treatment and control groups remain balanced with respect to a wide range of baseline characteristics in the non-attrited sample available at endline, both at the employee level (Tables A.1) and at the firm level (Table A.4).

Third, we calculate Lee bounds (Lee, 2009). Lee bounds provide treatment effect estimates in the presence of selective attrition by trimming the treatment group's outcome distribution to match control group attrition rates. The bounds assume treatment affects selection monotonically and are calculated by removing observations from either the top or bottom of the treatment distribution. Results are reported in Panel B of Table A.13 and are broadly consistent with effects reported above.

Consistency with employer reports   Are our employee-level results consistent with available firm data? Panel A of Table A.12 re-runs the main analysis using (employer-reported) firm-level data. Our outcome variables are now defined in terms of the share of employees in a firm earning at least the minimum wage, having a written contract, or being registered for social security, with the formality index being the average of these three dimensions. All of the significant results from our main employee-level regressions reported in Table 2 are mirrored in the firm-level data. In fact, effects appear generally larger and more significant at the firm level, suggesting that treatment effects are driven by small rather than large firms.[28] This interpretation is supported by heterogeneity analyses in Table 4, which shows larger effects for smaller firms.[29]

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[28]Without weights, each employee observation has the same weight in the data, meaning that if the treatment was less effective in larger firms, we have more observations with smaller treatment effects in the employee dataset.

[29]Unlike the employee-level analysis, firm-level results show a significant increase in the share of employees registered with social security six months after treatment. This is not explained by the higher share of large firms in the employee data. Even after weighting the employee data by the inverse of firm size (Panel B, Table A.12), no effect on social security registration is observed. We suspect short-term over-reporting by employers due to social desirability bias. If so, there should be more instances where employers report higher benefits than

4   Mechanisms

Next, we study the mechanisms through which the consulting intervention could have improved formality and wages as outlined in our theory of change in Section 2.3. Our discussions are based on estimating treatment effects on additional outcomes at the firm level, as well as effect heterogeneity of the main effects at the firm and employee level. It should be noted that the different mechanisms may overlap to some extent and that our intervention design does not allow us to make strong causal claims about them. However, these analyses are informative as they shed light on employers' decisions to grant higher degrees of formality and wages.

Firm performance

If higher employment formality resulted from higher firm performance, we would expect to see positive treatment effects on firms' annual revenues and labor costs along with zero or positive effects on profits. Average treatment effects reported in Table 3 do not provide strong support for this hypothesis. We find positive but largely insignificant average effects on revenues and profits in the year following the intervention, and muted effects on labor costs. Additionally, if firm performance were driving employment formality and wage improvements, we would expect similar patterns of heterogeneity across firm performance variables and employment formality indicators and wages, but our empirical results reveal the opposite. For firm performance, the largest enterprises with more than 6 employees are the only category where we observe large and partly significant treatment effects (see Panel B of Table 3),[30] while the treatment effects on employment formality and wages are driven by the smallest firms with 1-3 employees (Tables 4 and 6). Concluding that improvements in firm performance are unlikely to be the main driver of the observed positive effects on employment formality and wages.

Yet, despite the absence of strong effects on firm performance, it is plausible that firm owners formalized with the expectation of boosting employee productivity and ultimately firm performance in the medium- to long-term. The effects we expect under this hypothesis are subtly different: Assuming that a profit-maximizing entrepreneur only formalizes if the benefits outweigh the costs, our first expectation is to see increases in labor productivity that compensate for higher per-capita labor costs, and zero or positive effects on profits. While the treatment effects shown in Table 3 are insignificant for the smallest firms, we cannot rule out moderate positive effects of less than 9% of the control group mean on labor productivity, and smaller

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employees. Table A.11 confirms this with a significant short-term effect on employers reporting higher social security affiliation, but no long-term or systematic over-reporting.

[30]Consistent with this observation, quintile regressions reveal that positive treatment effects are concentrated at the top of the conditional distribution (see Figure A.4). The positive effects on profits and firm productivity appear to be linked to a contraction in the number of employees.

effects of roughly 3% on labor costs per capita, which are below the minimum detectability threshold given the small subsample size. Consistent with potentially higher labor productivity, we find that employees in the smallest firms report significantly higher job satisfaction compared to those in larger firms (Table 6).

A second implication of the cost-benefit calculus is that employers offer elements of employment formality that have a favorable benefit-cost ratio. While we cannot quantify the benefits, we approximate the costs:[31] for the median non-compliant firm, achieving full minimum wage compliance would lead to a 12.5% increase, and achieving full social security compliance to a 16.7% increase in labor costs (Figure A.1), while issuing written contracts should not have direct cost implications.[32] These relatively modest cost implications are in line with the observed small and insignificant increases in labor costs considering our effect sizes,[33] and the observed, positive effects on minimum wages and written contracts. The muted impacts on social security are somewhat puzzling considering that direct compliance costs are not much higher than for minimum wages, but may be explained by factors such as the administrative burden of regular declarations to the social security body, the more binding nature of social security registration, the less tangible valuation of its benefits from the employer's point of view, and the fact that the costs of social security compliance may be added to those of minimum wage compliance.

We conclude that improved firm performance does not explain the observed increase in formality. However, we cannot rule out the possibility that employers formalized with the hope of boosting productivity and performance. This approach may also lead to selective formalization, which we discuss next.

Selective formalization

If employers selectively formalized elements of employment relationships with certain workers in the hope of boosting productivity and retention, we would expect larger treatment effects for workers whom employers would like to retain or attract. This may be particularly relevant for less common or "higher-value" elements of employment formality, such as written contracts and social security. Similarly, employers may use wage increases beyond the legally required minimum to motivate key workers.

To study the selective formalization channel, we first analyze whether treatment effects on

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[31] These numbers are based on back-of-the envelope calculations for the whole firm, obtained by (i) multiplying the number of workers earning below the minimum wage with the gap to the minimum wage, and (ii) multiplying the share of non-registered workers in the firm with the firm's contributions due for all workers.

[32] As outlined in Section 2.1, oral contracts are equally binding under Côte d'Ivoire's employment legislation. While employers may still feel more constrained by written contracts, the direct costs are not different.

[33] The observed effects on labor costs do not fully capture the wage increases of about 5% on average (Table 2), rising to around 20% for the smallest firms (Table 6). There are multiple reasons why wage costs may not be directly reflected in the total wage bill. One hypothesis is informal side-payments, which we discuss below.

employment formality are higher for workers who, based on their observable characteristics, have a high predicted probability of receiving a given element of employment formality (see Table 5). The empirical evidence provides *some* support for selective formalization as an HR management tool. For social security, we see a positive and significant treatment effect of 8.2 pp for employees with a high predicted probability of social security access. For written contracts, we see positive effects regardless of the predicted probability and across heterogeneity dimensions, but somewhat larger and (weakly) significant treatment effects for those with tertiary education and in supervisory roles (9.8 and 8.6 pp respectively). The patterns are similar for wages (see Table 7), where supervisors and employees with tertiary education received larger wage increases following the treatment (13.8 and 11.8 pp), and the treatment effects are largest at the 70th percentile of the conditional distribution (see Table A.10). These patterns suggest that part of the positive, average effects on employment formality can be attributed to employers using selective formalization to motivate key employees. At the same time, the heterogeneity analyses also reveal effect patterns that cannot be explained by selective formalization, for example "catching-up" effects where groups with lower baseline access to minimum wages see larger treatment effects, suggesting other mechanisms are at play simultaneously.

We do not find evidence of treatment-induced changes in workforce composition – selective attrition, selective hiring, or churning – that could be an alternative explanation for these results, for example if employers hired more qualified workers. The endline sample remains mostly balanced, with the exception of slightly more secondary-educated and less tertiary-educated individuals in the treatment group (Table A.1)[34], which is also reflected in the composition of new hires (Table A.2). There are no differences in employee-initiated departures across treatment conditions (Table 2), and no significant changes in aggregate employment or attrition at the firm level (Table 3, columns (11) and (12)).

Awareness

Next, we discuss to what extent the intervention could have induced employment formalization through increased awareness of labor regulations. At baseline, 24% of firm managers reported having no knowledge of the Ivorian labor code, and 55% had moderate knowledge. First, looking at direct knowledge improvements, we find that treatment improved employers' knowledge of labor regulations, with the share of managers reporting moderate rather than no knowledge of the labor code increasing by 8.3 pp (Table A.14). Second, mediation analysis suggests that these increases from "no knowledge" to "moderate or high knowledge" explain – even though

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[34]Note that attrition can also be caused by other means such as employee-initiated quits or other reasons for interview attrition. Nevertheless, comparing the baseline sample still present at endline seems to be a good approximation of a change in the workforce composition.

statistically insignificantly or marginal significantly – 22% of the effect on minimum wages and 25% of the effect on written contracts (Table A.15).[35]

Furthermore, we find evidence of increased awareness that extends beyond the improvements directly reported by employers in their self-reported knowledge. First, we see evidence of catching-up effects particularly for minimum wage compliance, where employee groups with lower baseline access experience larger treatment effects, for example younger workers partly or fully close the gap with their older peers due to the treatment (Table 5). Second, new employees experienced larger treatment effects on minimum wage provision and written contracts, suggesting that employers became more likely to formalize employment right away, before observing an employee's productivity level (Table 5). Last, the legal minimum wage increased between our second and third data collection. 18 months post-treatment we see that the positive treatment effects are caused by a lower control group mean, indicating that control group firms were less aware of legislative changes and thus did not update their payments to the new minimum wage value (Table 2).

An increase of awareness could have also caused an increase in the fear of detection and enforcement. If formalization were driven by such concerns, we would expect larger treatment effects wherever the expected costs of non-compliance are high, meaning a high probability of inspection and high expected fines and back payments. Insights from the literature and expert interviews for Côte d'Ivoire suggest that this is likely to occur in larger firms, particularly regarding social security compliance. In addition, the effect is expected to be stronger in firms that have already registered at least one employee[36] and among employees who are more inclined to report violations, especially those who are more educated or dissatisfied with their working conditions. The observed results largely show the opposite, with positive effects on employment formality being concentrated in the smallest firms (Table 4), muted impacts on social security and no higher probability for firms that are already on the inspection roster (having at least one employee already registered at CNPS) (Table 2 and Table 4), and no evidence of larger treatment effects for workers posing a higher complaint risk.[37]

Reducing informal side-payments

A new literature has identified that employers under-report wages to official authorities – such

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[35]Additionally, we observe that employers who did not previously have experience with written contracts and social security start providing them (Table 4), although the effects are not statistically significant.

[36]Those firms are accordingly registered at the social security agency and thus could be potentially inspected.

[37]We do observe a larger and weakly significant treatment effect on written contracts for tertiary-educated workers (Table 5). However, written contracts are not obligatory and we do not observe larger effects on minimum wages and social security. Also, the positive effects on written contracts are concentrated among employees who were satisfied with their job at baseline (Table 5), making it less plausible that written contracts were a means to minimize complaint risks.

as the social security body – to minimize payroll taxes paid on wages. In other words, employers report only a certain amount of the wage and pay the rest of the wage in cash as a payment under the table (Feinmann *et al.*, 2022).[38]

We implement a double-list experiment to assess whether informal side-payments are prevalent in our context. We randomly split our sample (employees indicating being affiliated with social security via their employer) into two groups (group 0 and group 1), serving as a control or treatment group in the first or second list, respectively. Both groups are subjected to a list without the sensitive question and a list with the sensitive question, which is framed as "I often receive a salary higher than what is indicated in my written contract/on my payslip". Additionally, we ask the sensitive question directly after the list experiment.[39]

Looking at the outcome of the direct question, 15.72% of the respondents state that they receive a higher salary than is declared to the CNPS. We then turn to the double-list experiment and use a difference-in-means estimator following Droitcour *et al.* (2004) in order to estimate the share of our sample population that received informal side-payments:

$$P(S_i = 1) = \left[\left\{ \frac{\sum_{i=1}^{n} Y_i^A T_i}{\sum_{i=1}^{n} T_i} - \frac{\sum_{i=1}^{n} Y_i^A (1 - T_i)}{\sum_{i=1}^{n} (1 - T_i)} \right\} + \left\{ \frac{\sum_{i=1}^{n} Y_i^B (1 - T_i)}{\sum_{i=1}^{n} (1 - T_i)} - \frac{\sum_{i=1}^{n} Y_i^B T_i}{\sum_{i=1}^{n} T_i} \right\} \right] / 2, \tag{3}$$

where $P(S_i = 1)$ is the probability of a respondent answering affirmatively to the sensitive item, Y_i^A is respondent i's answer to Question List A, Y_i^B is respondent i's answer to Question List B, T_i is the treatment indicator, where $T_i = 1$ if respondent i is in group 1 and $T_i = 0$ if in group 0, $\sum_{i=1}^{n} T_i$ is the total number of respondents in the treatment group, $\sum_{i=1}^{n} (1 - T_i)$ is the total number of respondents in the control group, n is the total sample size. Standard errors are clustered at the firm-level.[40]

The results of the list experiment suggest that the share of employees receiving informal side-payments is higher than the responses to the direct question indicate. On average, individuals facing the longer list select 0.25 more items than individuals facing the shorter list, meaning an estimated 25% of individuals receive higher wages in cash than indicated on their payslips (Table A.16). Heterogeneity analysis suggests that the practice of informal side-payments is more common in small- and medium-sized firms.[41]

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[38]While evidence on the topic is scarce, anecdotal reports suggest that these payments are not necessarily made on a monthly basis but may also include bonuses or other forms of compensation.

[39]The other items on list 1 are: 1) I think that women should receive the same salary as men for the same work. 2) I think that the first priority of women should be the family. 3) I voted in the last elections. 4) I think that the current government's projects regarding universal health insurance (CMU) are not sufficient. The other items on list 2 are: 1) I think that social security should only be granted to the most efficient employees. 2) I take the "woro-woro" to go to work. (Note: "woro-woro" is a local term for taxi.) 3) My current job is exactly what I was trained for. 4) I have been sick in the last three months.

[40]In practice, implement the STATA command *kict ls* by Tsai (2019), which uses least squares estimation specifically for double list experiments. Results are robust to weighting observations at the firm-level.

[41]Those findings are broadly in line with Feinmann *et al.* (2024) who find that payments under the table decrease

Given the short-term increase in employers' over-reporting of social security registration following our consulting intervention, one might be concerned about the PAP-PME also leading to higher informal side-payments. Having only implemented the list experiment in the endline data collection, we cannot see how those informal-side payments developed over time in the PAP-PME treatment and control group. Yet, doing explorative heterogeneity analysis using the endline data, we see that informal side-payments in the PAP-PME control group are *higher* than in the treatment group (32% vs. 20%), suggesting that the PAP-PME treatment did not lead to more under-reporting of wages and potentially even had a positive impact on truthful reporting. In addition, we see this behavior more pronounced in firms with at most six employees where the treatment effect on wages was strongest. We thus tentatively conclude that the treatment did not increase informal side-payments but rather formalized informal payment streams.

Therefore, the observed wage increase in the treatment group described in Section 3 can potentially be attributed to the formalization of previously informal payment streams. Nevertheless, one should keep in mind that this formalization represents real additional costs for employers through increased social security contributions of around 22%-25% on formal wages (which employers try to avoid through informal side-payments). We roughly estimate that treatment firms need to pay around 14.9% higher social security contributions per registered employee in comparison to the control group, which would represent an increase of 3.8% of the control group labor costs.[42] Having said that, the increase in contributions also represents and increase in future benefits for employees.

5   Conclusion

Employment formalization is low in many MSMEs in Sub-Saharan Africa. By conducting a rigorous impact evaluation, this paper looks at the impacts of a light-touch consulting program on employment formality in Côte d'Ivoire. Our main results show a significant increase in minimum wage compliance and the provision of written contracts, with employees in small firms and newly hired workers benefiting the most from the treatment.

Our analysis explores several mechanisms that may be driving these improvements. First, we find that improved firm performance caused by our intervention is unlikely to explain the observed effects. However, there is suggestive evidence that firms formalized employment in

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with firm-size. However, Feinmann *et al.* (2024) look at firms with up to 5,000 employees.

[42]We estimate the control mean of wages 18 months post-treatment and the corresponding treatment effect. Based on those estimates we can calculate the social security contributions per employee registered. Weighting those numbers by the average number of employees registered we are able to have a rough estimation of the increase in social security contribution in the treatment group compared to the control group. Lastly, we can express this increase as a share of the 2022 labor costs of control firms.

the hope of boosting productivity and performance. In this context, selective formalization appears to have played a role, with heterogeneity analysis indicating that firms provide greater formality to employees they seek to retain and attract. Despite this, we do not observe changes in workforce composition. Awareness of labor regulations likely contributed to these improvements, whereas the increased awareness did not lead to higher fear of enforcement. Additionally, we find suggestive evidence that firms partially achieved these improvements by formalizing existing informal payment streams, as treatment firms reported lower rates of informal side-payments payments compared to control firms.

The paper contributes to the ongoing debate on enhancing employment standards in low- and middle-income countries. The results suggest a relatively light-touch program can improve formality without adversely affecting firms' revenue or profits. While the literature suggests that increasing the costs of non-compliance or reducing compliance costs may benefit certain employees, it often raises firms' costs, leading to potential reductions in real wages, layoffs, or firm exits. However, our findings demonstrate that a tailored, even light-touch, consulting intervention can effectively shift employers' cost-benefit perceptions and enhance their awareness of regulations. This, in turn, results in improvements for employees without a significant negative impact at the firm level.

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6   Figures and Tables

Table 1: Balance at baseline – Employee-level data

	Treatment (1)		Control (2)		Orthogonality Mean (1)-(2)	
	N	Mean	N	Mean	Difference	P-value
Individual characteristics						
Age	988	34.31	605	34.53	-0.22	0.63
Male	988	0.65	605	0.66	-0.01	0.76
Married or cohabiting	988	0.51	602	0.51	-0.00	0.88
Education: none	988	0.06	602	0.06	-0.00	0.95
Education: primary	988	0.10	602	0.09	0.01	0.74
Education: secondary	988	0.32	602	0.34	-0.02	0.36
Education: tertiary	988	0.53	602	0.51	0.02	0.49
Work situation						
Supervisory role	988	0.39	605	0.39	0.00	0.99
Number of staff supervised	988	3.90	605	2.93	0.97	0.14
Experience in sector (years)	988	6.17	603	6.40	-0.23	0.46
Tenure (years)	988	3.83	605	3.98	-0.15	0.48
Outcomes						
Written contract	968	0.47	593	0.46	0.01	0.75
Social security	938	0.38	572	0.41	-0.03	0.26
Monthly wage (mil. FCFA)	925	0.14	564	0.13	0.01	0.32
At least min. wage	925	0.85	564	0.83	0.02	0.21
Formality index	988	0.56	603	0.56	-0.00	0.96
Weekly hours	968	43.37	589	43.74	-0.37	0.57
Satisfied	984	0.76	598	0.76	-0.00	0.89
Training participation	988	0.22	605	0.22	-0.00	0.95

Notes: The table shows balance across treatment and control groups with respect to the main outcome variables and additional individual characteristics at baseline using the employee dataset. Employers are excluded.

Table 2: Employee-level treatment effects

Panel A: Main Outcomes

	Min. Wage (0/1)			Written Contract (0/1)			Social Security (0/1)			Formality Index (0-1)		
	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled
ITT	0.02	0.11***	0.06**	0.07*	0.07	0.07*	0.04	0.03	0.03	0.06**	0.07**	0.06***
	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.03)	(0.02)	(0.03)	(0.02)
R^2	0.36	0.31	0.32	0.39	0.35	0.36	0.48	0.43	0.45	0.52	0.45	0.48
Mean	0.84	0.73	0.79	0.53	0.54	0.53	0.39	0.46	0.42	0.59	0.58	0.59
LATE	0.04	0.17***	0.10**	0.12*	0.11	0.12*	0.06	0.04	0.05	0.10**	0.10**	0.10***
	(0.06)	(0.06)	(0.05)	(0.07)	(0.07)	(0.06)	(0.05)	(0.06)	(0.05)	(0.04)	(0.04)	(0.04)
R^2	0.27	0.17	0.22	0.30	0.25	0.27	0.42	0.34	0.38	0.43	0.30	0.36
Mean	0.86	0.76	0.81	0.56	0.55	0.56	0.43	0.49	0.46	0.62	0.61	0.61
N	962	826	1788	977	876	1853	925	807	1732	980	879	1859

Panel B: Additional Outcomes

	Log. Wage			Satisfaction (0/1)			Hours Worked			Training (0/1)		
	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled
ITT	0.05	0.14**	0.09**	-0.03	0.01	-0.01	-1.50	-0.46	-1.08	-0.04	0.04	-0.00
	(0.04)	(0.06)	(0.04)	(0.04)	(0.04)	(0.03)	(1.18)	(1.30)	(1.05)	(0.04)	(0.04)	(0.03)
R^2	0.56	0.47	0.51	0.15	0.11	0.12	0.24	0.22	0.21	0.19	0.12	0.15
Mean	4.69	4.75	4.72	0.66	0.63	0.64	46.16	45.38	45.78	0.41	0.29	0.35
LATE	0.09	0.22**	0.14**	-0.05	0.01	-0.02	-2.67	-0.72	-1.80	-0.07	0.06	-0.00
	(0.08)	(0.10)	(0.07)	(0.07)	(0.06)	(0.05)	(2.05)	(2.02)	(1.73)	(0.07)	(0.06)	(0.05)
R^2	0.40	0.31	0.36	0.12	0.09	0.10	0.19	0.14	0.16	0.17	0.10	0.14
Mean	4.71	4.79	4.75	0.65	0.63	0.64	45.76	45.39	45.59	0.41	0.30	0.35
N	940	810	1750	977	876	1853	979	860	1839	980	879	1859

Panel C: Retention

	Left (0/1)		Quit (0/1)		Laid off (0/1)	
	6 M.	18 M.	6 M.	18 M.	6 M.	18 M.
ITT	0.02	0.02	-0.01	0.03	0.01	0.00
	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
R^2	0.07	0.07	0.05	0.08	0.09	0.05
Mean	0.11	0.17	0.07	0.08	0.02	0.04
LATE	0.04	0.04	-0.02	0.05	0.02	0.00
	(0.05)	(0.05)	(0.04)	(0.04)	(0.03)	(0.03)
R^2	0.05	0.05	0.03	0.05	0.04	0.03
Mean	0.12	0.19	0.07	0.08	0.03	0.05
N	943	909	877	813	844	769

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

Notes: Panel A reports the β_1 coefficient from Model 1. Panel B reports additional outcomes and Panel C reports retention outcomes, using the same specification as Panel A. For Panel C, the sample excludes new employees, retaining only those employed in the previous wave. All regressions include the lagged dependent variable and strata variables. The lagged dependent variable is standardized, with missing values set to zero and a dummy variable indicating missingness. Mean refers to the control group mean. Robust clustered standard errors at the firm level are shown in parentheses.

Table 3: Firm-level treatment effects

	Revenue		Profits		Labor Productivity		Labor Costs		Labor Costs p.c.		Employment	
	(1) TH. USD	(2) IHS	(3) TH. USD	(4) IHS	(5) TH. USD	(6) IHS	(7) TH. USD	(8) IHS	(9) TH. USD	(10) IHS	(11) Empl.	(12) Empl.(Log)
Panel A: Overall effect												
ITT	5.61	0.20	2.18	0.65**	-1.19	0.17	0.32	0.07	-0.10	0.05	0.29	0.00
	(13.16)	(0.15)	(1.73)	(0.32)	(3.16)	(0.14)	(2.39)	(0.14)	(0.44)	(0.14)	(0.36)	(0.06)
R^2	0.714	0.803	0.678	0.917	0.639	0.374	0.685	0.772	0.686	0.712	0.263	0.381
Mean	128.86	11.09	9.13	4.38	28.88	3.29	26.66	9.65	5.50	8.33	4.73	1.33
N	335	335	299	299	323	321	357	357	355	355	355	355
Panel B: By number of staff												
1-3 employees	4.827	-0.00772	1.704	0.468	1.799	0.125	1.543	0.245	0.0897	0.277	0.0157	-0.0401
	(21.09)	(0.246)	(2.585)	(0.483)	(5.114)	(0.242)	(2.845)	(0.268)	(0.797)	(0.262)	(0.605)	(0.099)
Mean	55.312	10.105	4.454	3.548	21.235	2.876	9.132	8.37	3.39	7.56	2.721	0.898
N	102	102	90	90	97	95	107	107	107	107	108	108
4-6 employees	4.210	0.0324	2.195	-0.457	-6.517	-0.0216	2.334	0.0449	0.0578	0.001	0.898	0.0362
	(20.63)	(0.180)	(3.296)	(0.489)	(5.143)	(0.195)	(3.429)	(0.227)	(0.735)	(0.226)	(0.718)	(0.106)
Mean	114.905	11.027	10.59	5.874	31.193	3.441	24.385	9.665	6.144	8.379	4.138	1.276
N	128	128	118	118	124	124	137	137	136	136	137	137
6+ employees	14.75	0.585	3.704	1.975***	3.718	0.501*	-3.267	-0.120	-0.190	-0.113	-0.590	-0.0768
	(28.55)	(0.375)	(2.771)	(0.607)	(6.324)	(0.284)	(5.647)	(0.213)	(0.811)	(0.221)	(0.758)	(0.130)
Mean	214.523	12.091	11.447	3.29	32.977	3.529	45.864	10.824	6.664	8.98	7.422	1.8
N	105	105	91	91	102	102	113	113	112	112	110	110
P-val. for diff. in coeff. 1 and 2	.984	.898	.906	.179	.267	.639	.86	.554	.977	.393	.38	.602
P-val. for diff. in coeff. 1 and 3	.774	.199	.593	.054	.82	.327	.461	.291	.803	.253	.558	.828
P-val. for diff. in coeff. 2 and 3	.776	.195	.734	.002	.221	.123	.4	.606	.83	.725	.191	.504

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

Notes: The table reports coefficients from firm-level regressions. All dependent variables are annual values for 2022, the year following the treatment. TH. USD values are expressed in '000 USD, converted at the June 2021 exchange rate of 537.286, and winsorized at the 95th percentile. IHS columns use the inverse hyperbolic sine transformation of these values. All regressions include the lagged dependent variable (averaged over 2018–2020) and strata fixed effects. Missing values for lagged dependent variables are replaced with the mean of the estimation sample, and regressions include an indicator variable to account for such cases. Mean refers to the control group mean. Robust standard errors in parentheses.

Table 4: Heterogeneous effects by firm characteristics – Main outcomes

	Minimum Wage	Written Contract	Social Security	Formality Index
Panel A: Number of Staff				
1-3 employees	0.150**	0.195**	0.090	0.150**
	(0.071)	(0.094)	(0.072)	(0.063)
Mean	0.706	0.402	0.310	0.477
N	272	284	268	285
4-6 employees	0.066*	0.023	0.056	0.056
	(0.038)	(0.058)	(0.048)	(0.036)
Mean	0.767	0.559	0.376	0.572
N	684	710	659	712
6+ employees	0.032	0.073	-0.003	0.036
	(0.039)	(0.051)	(0.043)	(0.032)
Mean	0.825	0.547	0.493	0.628
N	832	859	805	862
P-val. for diff. in coeff. 1 and 2	0.288	0.112	0.701	0.193
P-val. for diff. in coeff. 1 and 3	0.143	0.259	0.282	0.120
P-val. for diff. in coeff. 2 and 3	0.523	0.515	0.379	0.690
Panel B: Location				
In Abidjan	0.019	0.010	0.019	0.018
	(0.024)	(0.044)	(0.036)	(0.026)
Mean	0.895	0.684	0.490	0.695
N	1065	1105	1019	1109
Outside Abidjan	0.148***	0.154***	0.034	0.121***
	(0.054)	(0.054)	(0.046)	(0.036)
Mean	0.625	0.304	0.324	0.422
N	723	748	713	750
P-val. for diff. in coeff.	0.034	0.044	0.785	0.023
Panel C: Manager Education				
Tertiary	0.043*	0.069*	0.059*	0.064**
	(0.026)	(0.042)	(0.035)	(0.026)
Mean	0.870	0.624	0.481	0.665
N	1216	1252	1156	1258
Below Tertiary	0.121**	0.085	-0.019	0.065
	(0.061)	(0.065)	(0.045)	(0.042)
Mean	0.556	0.283	0.271	0.370
N	562	591	566	591
P-val. for diff. in coeff.	0.237	0.839	0.170	0.984

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

Notes: The Table shows the heterogeneous ITT effects of the main outcome variables of interest using a pooled sample (6 and 18 months post-treatment). Coefficients are obtained from a regression where treatment assignment is interacted with the categories of the heterogeneity dimension indicated in each panel, and the ITT effect for individuals in the respective category is the sum of the coefficients of assignment to treatment and the interaction term. Regressions include the lagged dependent variable and strata. Mean refers to the control group mean. P-values indicate whether ITTs differ significantly between categories. Robust clustered standard errors in parentheses.

Table 4 (ctd.): Heterogeneous effects by firm characteristics – Main outcomes

	Minimum Wage	Written Contract	Social Security	Formality Index
Panel D: Baseline Knowledge				
No knowledge	0.067	0.034	-0.018	0.047
	(0.070)	(0.080)	(0.066)	(0.055)
Mean	0.593	0.303	0.300	0.400
N	385	395	376	398
Moderate knowledge	0.065**	0.079*	0.056	0.069**
	(0.032)	(0.047)	(0.037)	(0.028)
Mean	0.804	0.504	0.357	0.564
N	982	1018	944	1021
High knowledge	0.036	0.067	0.015	0.042
	(0.040)	(0.060)	(0.062)	(0.042)
Mean	0.944	0.821	0.690	0.823
N	421	440	412	440
P-val. for diff. in coeff. 1 and 2	0.968	0.615	0.312	0.717
P-val. for diff. in coeff. 1 and 3	0.710	0.741	0.723	0.943
P-val. for diff. in coeff. 2 and 3	0.581	0.877	0.576	0.608
Panel E: Labour Productivity				
1st Tertile	0.112*	0.078	0.073	0.100**
	(0.062)	(0.056)	(0.047)	(0.039)
Mean	0.591	0.329	0.240	0.391
N	577	604	576	609
2nd Tertile	0.043	0.081	0.036	0.055
	(0.038)	(0.062)	(0.053)	(0.040)
Mean	0.832	0.612	0.436	0.637
N	592	610	564	611
3rd Tertile	0.025	0.070	-0.007	0.036
	(0.028)	(0.060)	(0.049)	(0.033)
Mean	0.955	0.659	0.621	0.747
N	586	606	560	606
P-val. for diff. in coeff. 1 and 2	0.341	0.971	0.605	0.421
P-val. for diff. in coeff. 1 and 3	0.208	0.928	0.229	0.206
P-val. for diff. in coeff. 2 and 3	0.701	0.905	0.564	0.711
Panel F: By baseline provision of benefit				
No employee had benefit	-0.00	0.0589	0.0811	
	(0.109)	(0.0532)	(0.0502)	
Mean	0.380	0.270	0.146	
N	152	828	495	
Some employees had benefit	0.219***	0.0493	0.0314	
	(0.0693)	(0.0885)	(0.0425)	
Mean	0.568	0.622	0.416	
N	392	357	877	
P-val. for diff. in coeff.	0.067	0.924	0.454	

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

Notes: The Table shows the heterogeneous ITT effects of the main outcome variables of interest using a pooled sample (6 and 18 months post-treatment). Coefficients are obtained from a regression where treatment assignment is interacted with the categories of the heterogeneity dimension indicated in each panel, and the ITT effect for individuals in the respective category is the sum of the coefficients of assignment to treatment and the interaction term. Regressions include controls for the lagged dependent variable and strata. Mean refers to the control group mean. P-values indicate whether ITTs differ significantly between categories. Robust clustered standard errors in parentheses. Labor productivity is calculated by dividing annualized revenue by the number of workers (for 2018-2020, in '000 EUR, means by tertile 1.6, 7.6, and 55). Panel F only includes those employees working in firms where no or some employees receive the benefit. Those employees working in firms where all employees receive the benefit are excluded.

Table 5: Heterogeneous effects by employee characteristics – Main outcomes

	Minimum Wage	Written Contract	Social Security	Formality Index
Panel A: Gender				
Male	0.051*	0.070*	0.029	0.056**
	(0.027)	(0.039)	(0.033)	(0.024)
Mean	0.817	0.517	0.434	0.591
N	1123	1170	1093	1175
Female	0.079**	0.068	0.033	0.065*
	(0.037)	(0.054)	(0.041)	(0.033)
Mean	0.735	0.556	0.403	0.576
N	665	683	639	684
P-val. for diff. in coeff.	0.439	0.979	0.923	0.795
Panel B: Employee Education				
Tertiary	0.043	0.098*	0.031	0.061*
	(0.029)	(0.050)	(0.050)	(0.032)
Mean	0.903	0.658	0.510	0.703
N	563	583	516	584
Less than Tertiary	0.070**	0.054	0.030	0.059**
	(0.033)	(0.044)	(0.031)	(0.026)
Mean	0.719	0.457	0.376	0.517
N	1225	1270	1216	1275
P-val. for diff. in coeff.	0.478	0.464	0.975	0.951
Panel C: Experience				
6+ years	0.036	0.021	0.033	0.035
	(0.030)	(0.042)	(0.032)	(0.025)
Mean	0.828	0.565	0.506	0.640
N	942	974	907	979
Up to 5 years	0.087***	0.120***	0.023	0.083***
	(0.033)	(0.046)	(0.041)	(0.030)
Mean	0.742	0.499	0.343	0.531
N	843	876	822	877
P-val. for diff. in coeff.	0.149	0.058	0.829	0.142
Panel D: Age				
30 or older	0.033	0.033	0.022	0.036
	(0.028)	(0.038)	(0.030)	(0.023)
Mean	0.827	0.562	0.481	0.628
N	1291	1345	1242	1349
Younger than 30	0.121***	0.157***	0.040	0.110***
	(0.045)	(0.057)	(0.052)	(0.039)
Mean	0.691	0.458	0.298	0.488
N	493	503	485	505
P-val. for diff. in coeff.	0.071	0.039	0.747	0.074
Panel E: Employment Status				
Old Employee	0.040	0.055	0.036	0.051**
	(0.026)	(0.038)	(0.028)	(0.023)
Mean	0.812	0.554	0.459	0.613
N	1493	1547	1441	1553
New Employee	0.172***	0.147**	-0.000	0.107**
	(0.055)	(0.067)	(0.064)	(0.047)
Mean	0.650	0.413	0.235	0.438
N	295	306	291	306
P-val. for diff. in coeff.	0.015	0.178	0.562	0.230

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

Notes: See notes for Table 4.

Table 5 (ctd.): Heterogeneous effects by employee characteristics

	Minimum Wage	Written Contract	Social Security	Formality Index
Panel F: Supervisory Role				
Supervisor	0.055**	0.086*	0.057	0.076***
	(0.024)	(0.044)	(0.039)	(0.026)
Mean	0.884	0.599	0.497	0.664
N	773	803	742	808
No Supervisor	0.066*	0.056	0.008	0.047*
	(0.035)	(0.042)	(0.032)	(0.027)
Mean	0.710	0.476	0.363	0.522
N	1010	1044	984	1045
P-val. for diff. in coeff.	0.741	0.521	0.240	0.310
Panel G: Baseline Satisfaction				
Satisfied	0.035	0.074*	0.034	0.054**
	(0.029)	(0.044)	(0.032)	(0.026)
Mean	0.830	0.539	0.433	0.607
N	1006	1040	970	1046
Not satisfied	0.010	0.007	0.052	0.027
	(0.049)	(0.060)	(0.049)	(0.036)
Mean	0.777	0.614	0.551	0.652
N	303	315	296	315
P-val. for diff. in coeff.	0.627	0.320	0.740	0.480
Panel H: Relationship with Employer				
Friends or Family	0.057	0.015	-0.001	0.025
	(0.039)	(0.060)	(0.042)	(0.035)
Mean	0.752	0.487	0.394	0.552
N	569	587	554	590
No relationship	0.033	0.083**	0.058	0.066**
	(0.028)	(0.041)	(0.037)	(0.026)
Mean	0.857	0.629	0.534	0.677
N	682	707	656	708
P-val. for diff. in coeff.	0.583	0.291	0.281	0.298
Panel I: By predicted probability of outcome				
Below median predicted probability	0.202**	0.0546	-0.0212	0.0493
	(0.0978)	(0.0550)	(0.0419)	(0.0336)
Mean	0.457	0.380	0.350	0.467
N	86	687	616	686
Above median predicted probability	0.0160	0.0506	0.0819**	0.0444
	(0.0271)	(0.0452)	(0.0382)	(0.0276)
Mean	0.843	0.746	0.593	0.776
N	1227	607	594	612
P-val. for diff. in coeff.	0.555	0.264	0.033	0.109

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

Notes: See notes for Table 4. In Panel I predictions are made using the following baseline characteristics: gender, relationship to the employer, experience (linear and squared), supervisor status, and education level.

Table 6: Heterogeneous effects by firm characteristics – Additional outcomes

	Log. Wage	Satisfaction	Hours worked	Training Participation
Panel A: Number of Staff				
1-3 employees	0.199*	0.179***	-0.540	0.054
	(0.106)	(0.065)	(2.028)	(0.071)
Mean	4.501	0.636	43.667	0.355
N	267	284	279	285
4-6 employees	0.116*	-0.056	-2.097	-0.025
	(0.064)	(0.044)	(1.649)	(0.053)
Mean	4.657	0.686	47.446	0.371
N	660	708	702	712
6+ employees	0.038	-0.041	0.277	-0.004
	(0.064)	(0.048)	(1.682)	(0.047)
Mean	4.831	0.612	45.081	0.332
N	823	861	858	862
P-val. for diff. in coeff. 1 and 2	0.501	0.003	0.548	0.379
P-val. for diff. in coeff. 1 and 3	0.193	0.007	0.762	0.497
P-val. for diff. in coeff. 2 and 3	0.374	0.826	0.296	0.770
Panel B: Location				
In Abidjan	0.008	-0.074**	0.666	-0.062
	(0.050)	(0.036)	(1.080)	(0.043)
Mean	5.017	0.706	43.475	0.407
N	1032	1104	1095	1109
Outside Abidjan	0.230***	0.077	-2.246	0.068
	(0.074)	(0.047)	(2.025)	(0.046)
Mean	4.298	0.551	49.182	0.266
N	718	749	744	750
P-val. for diff. in coeff.	0.017	0.013	0.215	0.038
Panel C: Manager Education				
Tertiary	0.086*	-0.021	0.246	-0.025
	(0.046)	(0.033)	(0.953)	(0.038)
Mean	4.862	0.662	44.160	0.394
N	1199	1254	1251	1258
Below Tertiary	0.091	0.002	-4.405*	0.048
	(0.093)	(0.064)	(2.595)	(0.056)
Mean	4.307	0.595	50.308	0.234
N	541	589	578	591
P-val. for diff. in coeff.	0.959	0.755	0.092	0.272
Panel D: Baseline Knowledge				
No knowledge	0.105	0.130**	-5.867*	0.049
	(0.096)	(0.065)	(3.102)	(0.062)
Mean	4.230	0.518	49.155	0.262
N	366	398	394	398
Moderate knowledge	0.082	-0.068*	1.031	-0.072*
	(0.053)	(0.038)	(1.088)	(0.044)
Mean	4.756	0.713	44.576	0.378
N	968	1016	1010	1021
High knowledge	0.041	-0.046	-1.508	0.114*
	(0.081)	(0.065)	(1.846)	(0.062)
Mean	5.119	0.630	44.856	0.386
N	416	439	435	440
P-val. for diff. in coeff. 1 and 2	0.824	0.008	0.032	0.108
P-val. for diff. in coeff. 1 and 3	0.626	0.068	0.252	0.458
P-val. for diff. in coeff. 2 and 3	0.680	0.770	0.240	0.012

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: See notes for Table 4.

Table 7: Heterogeneous effects by employee characteristics – Additional outcomes

	Log. Wage	Satisfaction	Hours worked	Training Participation
Panel A: Gender				
Male	0.067	-0.005	0.453	0.005
	(0.044)	(0.035)	(1.093)	(0.032)
Mean	4.802	0.622	45.970	0.317
N	1100	1171	1160	1175
Female	0.114*	-0.028	-3.469**	-0.014
	(0.064)	(0.043)	(1.484)	(0.051)
Mean	4.582	0.681	45.480	0.407
N	650	682	679	684
P-val. for diff. in coeff.& 0.473	0.650	0.008	0.703	
Panel B: Employee Education				
Tertiary	0.138**	0.010	-0.722	0.001
	(0.061)	(0.043)	(1.041)	(0.049)
Mean	5.002	0.650	43.670	0.432
N	552	582	582	584
Less than Tertiary	0.056	-0.026	-1.198	-0.003
	(0.049)	(0.037)	(1.322)	(0.036)
Mean	4.554	0.640	47.032	0.304
N	1198	1271	1257	1275
P-val. for diff. in coeff.	0.222	0.524	0.726	0.936
Panel C: Experience				
6+ years	0.023	-0.013	-0.875	0.009
	(0.054)	(0.036)	(1.315)	(0.041)
Mean	4.876	0.626	46.380	0.312
N	912	975	965	979
Up to 5 years	0.133***	-0.012	-1.314	-0.012
	(0.051)	(0.039)	(1.186)	(0.041)
Mean	4.566	0.659	45.330	0.392
N	835	875	871	877
P-val. for diff. in coeff.	0.075	0.979	0.749	0.682
Panel D: Age				
30 or older	0.045	-0.022	-0.345	-0.007
	(0.048)	(0.032)	(1.209)	(0.035)
Mean	4.816	0.624	44.574	0.323
N	1257	1345	1331	1349
Younger than 30	0.149***	0.014	-2.683*	0.024
	(0.057)	(0.045)	(1.390)	(0.051)
Mean	4.503	0.690	48.827	0.416
N	489	503	503	505
P-val. for diff. in coeff.	0.100	0.455	0.146	0.559
Panel E: Employment Status				
Old Employee	0.062	-0.016	-0.789	0.011
	(0.043)	(0.032)	(1.119)	(0.036)
Mean	4.775	0.639	45.492	0.340
N	1455	1549	1534	1553
New Employee	0.196**	-0.002	-2.329	-0.067
	(0.090)	(0.057)	(1.722)	(0.058)
Mean	4.443	0.667	47.331	0.405
N	295	304	305	306
P-val. for diff. in coeff.	0.134	0.820	0.382	0.226

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

Notes: See notes for Table 4.

Table 7 (ctd.): Heterogeneous effects by employee characteristics – Additional outcomes

	Log. Wage	Satisfaction	Hours Worked	Training Participation
Panel F: Supervisory Role				
Supervisor	0.118**	0.007	0.003	-0.046
	(0.047)	(0.039)	(1.094)	(0.042)
Mean	4.932	0.652	45.672	0.448
N	759	806	799	808
No Supervisor	0.060	-0.026	-1.757	0.029
	(0.053)	(0.034)	(1.275)	(0.038)
Mean	4.547	0.634	45.803	0.275
N	986	1041	1034	1045
P-val. for diff. in coeff.	0.298	0.459	0.130	0.112
Panel G: Relationship with Employer				
Friends or Family	0.042	-0.007	0.507	0.008
	(0.054)	(0.051)	(1.473)	(0.053)
Mean	4.656	0.655	45.568	0.323
N	542	588	585	590
No relationship	0.031	-0.023	-1.209	-0.043
	(0.046)	(0.044)	(1.213)	(0.050)
Mean	4.853	0.617	45.469	0.373
N	673	706	704	708
P-val. for diff. in coeff.	0.864	0.794	0.294	0.423

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

Notes: See notes for Table 4.

Online Appendix

Additional Tables

Additional Figures

Table A.1: Balance in sample available 18 months post-intervention –
Employee-level data

	Treatment (1)		Control (2)		Orthogonality Mean (1)-(2)	
	N	Mean	N	Mean	Difference	P-value
Individual characteristics						
Age	428	35.27	277	35.20	0.07	0.92
Male	428	0.67	277	0.65	0.01	0.69
Married or cohabiting	428	0.55	277	0.52	0.03	0.43
Education: none	428	0.06	277	0.05	0.01	0.72
Education: primary	428	0.13	277	0.10	0.02	0.34
Education: secondary	428	0.37	277	0.30	0.07	0.05
Education: tertiary	428	0.44	277	0.55	-0.10	0.01
Work situation						
Supervisory role	428	0.42	277	0.44	-0.02	0.58
Staff supervised	428	4.32	277	3.26	1.06	0.35
Experience in sector (years)	428	6.94	277	6.48	0.46	0.33
Tenure (years)	428	4.58	277	4.79	-0.22	0.53
Outcomes						
Written contract	409	0.45	268	0.48	-0.03	0.48
Social security	404	0.43	258	0.41	0.02	0.55
Monthly wage (mn. FCFA)	405	0.14	261	0.13	0.01	0.49
At least min. wage	405	0.89	261	0.85	0.04	0.12
Formality Index	428	0.58	277	0.58	0.00	0.88
Weekly hours	421	43.85	270	44.29	-0.44	0.64
Satisfied	425	0.79	277	0.75	0.04	0.23
Training participation	428	0.25	277	0.23	0.01	0.75

Notes: The table shows balance across treatment and control groups with respect to the main outcome variables and additional individual characteristics measured at baseline in the sample of employees available 18 months post-intervention. Employers are excluded. The table only includes individuals who responded to the endline survey and were still working in the firm during the endline survey.

Table A.2: Characteristics of new hires – Employee-level data

	Treatment (1)		Control (2)		Orthogonality Mean (1)-(2)	
	N	Mean	N	Mean	Difference	P-value
Individual characteristics						
Age	183	30.95	120	30.51	0.44	0.63
Male	185	0.54	120	0.54	-0.00	0.98
Education: at most primary	185	0.24	121	0.28	-0.04	0.40
Education: secondary	185	0.39	120	0.30	0.09	0.11
Education: tertiary	185	0.37	120	0.42	-0.04	0.45
Work situation						
Supervisory role	185	0.30	120	0.30	-0.00	0.96
Staff supervised	185	2.37	120	1.78	0.58	0.45
Experience in sector (years)	185	4.41	120	3.74	0.67	0.25

Notes: The table shows differences in the individual characteristics of newly hired employees at 6 and 18 months post-intervention, pooling across these two time periods. Employers are excluded.

Table A.3: Balance at baseline – Firm-level data

	Treatment (1)		Control (2)		Orthogonality Mean (1)-(2)		Take up (3)		No take up (4)		Orthogonality Mean (3)-(4)	
	N	Mean	N	Mean	Diff.	P-val.	N	Mean	N	Mean	Diff.	P-val.
Outcome variables												
Minimum wage (share)	234	0.787	167	0.787	-0.001	0.986	139	0.806	95	0.759	0.046	0.317
Written contract (share)	262	0.395	186	0.410	-0.015	0.731	158	0.386	104	0.410	-0.024	0.678
Social security (share)	261	0.400	186	0.405	-0.004	0.905	158	0.392	103	0.413	-0.021	0.667
Formality index	262	0.506	186	0.515	-0.009	0.764	158	0.504	104	0.509	-0.005	0.907
An. Revenue (2018–20, TH. USD)	260	118.930	182	122.846	-3.915	0.835	156	111.200	104	130.526	-19.327	0.433
An. profit (2018–20, TH. USD)	254	6.181	176	4.830	1.351	0.545	155	5.895	99	6.629	-0.734	0.808
Labor productivity	251	20.938	179	22.048	-1.110	0.699	153	20.070	98	22.293	-2.224	0.545
An. labor costs (2018–20, TH. USD)	254	18.679	175	18.231	0.448	0.844	157	16.129	97	22.806	-6.677	0.027
Strata variables												
Abidjan	262	0.687	186	0.645	0.042	0.354	158	0.646	104	0.750	-0.104	0.075
An. Revenue (2018–20, TH. USD)	260	118.930	182	122.846	-3.915	0.835	156	111.200	104	130.526	-19.327	0.433
Size: micro	260	0.608	182	0.593	0.014	0.763	156	0.660	104	0.529	0.131	0.034
Size: small	260	0.254	182	0.253	0.001	0.979	156	0.212	104	0.317	-0.106	0.055
Size: medium	260	0.138	182	0.154	-0.015	0.652	156	0.128	104	0.154	-0.026	0.559
Staff (2018-20)	262	6.846	186	6.524	0.322	0.739	158	6.912	104	6.744	0.168	0.895
1-3 staff	262	0.313	186	0.290	0.023	0.608	158	0.348	104	0.260	0.088	0.132
4-6 staff	262	0.370	186	0.387	-0.017	0.717	158	0.354	104	0.394	-0.040	0.516
More than 6 staff	262	0.317	186	0.323	-0.006	0.897	158	0.297	104	0.346	-0.049	0.409
Share of female staff	262	0.326	186	0.292	0.034	0.210	158	0.315	104	0.344	-0.029	0.460
Firm characteristics												
Sector: Agriculture	262	0.084	186	0.118	-0.034	0.230	158	0.095	104	0.067	0.028	0.432
Sector: Manufacturing	262	0.111	186	0.124	-0.013	0.674	158	0.120	104	0.096	0.024	0.545
Sector: Electricity, gas	262	0.015	186	0.011	0.005	0.683	158	0.000	104	0.038	-0.038	0.013
Sector: Construction	262	0.183	186	0.172	0.011	0.762	158	0.203	104	0.154	0.049	0.321
Sector: Services	262	0.607	186	0.575	0.032	0.503	158	0.582	104	0.644	-0.062	0.317
Firm age (years)	261	7.402	186	7.887	-0.485	0.457	158	7.190	103	7.728	-0.538	0.524
Capital stock (2018–20, TH. USD)	256	56.548	178	61.231	-4.683	0.745	158	52.615	98	62.889	-10.274	0.593
Registry of commerce	262	0.935	186	0.941	-0.006	0.805	158	0.949	104	0.913	0.036	0.250
Male manager	262	0.828	186	0.796	0.033	0.383	158	0.861	104	0.779	0.082	0.086
Manager with tertiary education	259	0.703	184	0.761	-0.058	0.177	157	0.637	102	0.804	-0.167	0.004

Notes: The table describes the balance between treatment and control groups with respect to the main outcome variables, strata variables, and additional firm characteristics at baseline, as well as differences between firms that took up treatment and those that did not. Take-up is defined as having received two or more visits from a consultant (as reported by the firm). Micro-sized firms: Revenue below 30 mn. FCFA; small-sized firms: revenue 30-150 mn. FCFA; medium-sized firms: revenue above 150 mn. FCFA.

Table A.4: Balance in sample available 18 months post-intervention – Firm-level data

	Observed (1)		Attrited (2)		Orthogonality Mean (1)-(2)		Treatment (3)		Control (4)		Orthogonality Mean (3)-(4)	
	N	Mean	N	Mean	Diff.	P-val.	N	Mean	N	Mean	Diff.	P-val.
Outcome variables												
Minimum wage (share)	327	0.786	74	0.790	-0.004	0.936	189	0.788	138	0.784	0.003	0.932
Written contract (share)	360	0.394	88	0.434	-0.040	0.462	213	0.392	147	0.396	-0.004	0.934
Social security (share)	359	0.394	88	0.437	-0.044	0.343	212	0.405	147	0.377	0.027	0.506
Formality index	360	0.506	88	0.526	-0.020	0.611	213	0.506	147	0.506	-0.000	0.993
Revenue (2018–20, TH. USD)	357	126.818	85	94.185	32.633	0.165	212	127.653	145	125.598	2.055	0.926
An. profit (2018–20, TH. USD)	352	5.349	78	6.888	-1.539	0.589	209	6.392	143	3.826	2.566	0.320
Labor productivity	352	21.209	78	22.262	-1.053	0.774	207	21.853	145	20.289	1.565	0.623
An. labor costs (2018–20, TH. USD)	357	18.488	72	18.536	-0.048	0.987	211	19.666	146	16.787	2.879	0.250
Strata variables												
Abidjan	360	0.639	88	0.795	-0.157	0.005	213	0.662	147	0.605	0.057	0.274
Revenue (2018–20, TH. USD)	357	126.818	85	94.185	32.633	0.165	212	127.653	145	125.598	2.055	0.926
Size: micro	357	0.608	85	0.576	0.031	0.596	212	0.608	145	0.607	0.002	0.976
Size: small	357	0.232	85	0.341	-0.109	0.038	212	0.236	145	0.228	0.008	0.856
Size: medium	357	0.160	85	0.082	0.077	0.069	212	0.156	145	0.166	-0.010	0.803
Staff (2018-20)	360	6.791	88	6.387	0.404	0.735	213	7.002	147	6.487	0.515	0.656
1-3 staff	360	0.300	88	0.318	-0.018	0.740	213	0.305	147	0.293	0.013	0.798
4-6 staff	360	0.383	88	0.352	0.031	0.591	213	0.376	147	0.395	-0.019	0.717
More than 6 staff	360	0.317	88	0.330	-0.013	0.817	213	0.319	147	0.313	0.006	0.899
Share of female staff	360	0.305	88	0.340	-0.035	0.306	213	0.314	147	0.292	0.022	0.462
Firm characteristics												
Sector: Agriculture	360	0.103	88	0.080	0.023	0.513	213	0.075	147	0.143	-0.068	0.038
Sector: Manufacturing	360	0.125	88	0.080	0.045	0.234	213	0.127	147	0.122	0.004	0.904
Sector: Electricity, gas	360	0.014	88	0.011	0.003	0.854	213	0.019	147	0.007	0.012	0.341
Sector: Construction	360	0.183	88	0.159	0.024	0.596	213	0.178	147	0.190	-0.012	0.772
Sector: Services	360	0.575	88	0.670	-0.095	0.103	213	0.601	147	0.537	0.064	0.232
Firm age (years)	359	7.549	88	7.830	-0.281	0.728	212	7.448	147	7.694	-0.246	0.722
Capital stock (2018–20, TH. USD)	351	56.370	83	67.342	-10.972	0.543	209	61.881	142	48.260	13.620	0.375
Registry of commerce	360	0.947	88	0.898	0.049	0.086	213	0.953	147	0.939	0.014	0.553
Male manager	360	0.847	88	0.682	0.165	0.000	213	0.859	147	0.830	0.029	0.450
Manager with tertiary education	358	0.712	85	0.788	-0.076	0.158	211	0.687	147	0.748	-0.061	0.210

Notes: The table describes the balance between treatment and control groups with respect to the main outcome variables, strata variables, and additional firm characteristics measured at baseline for firms observed in the endline survey (right side of the table), as well as differences between observed and attrited firms (left side of the table). Micro-sized firms: Revenue below 30 mn. FCFA; small-sized firms: revenue 30-150 mn. FCFA; medium-sized firms: revenue above 150 mn. FCFA.

Table A.5: Formality at baseline by employee characteristics

Panel A: Gender	Female	Male
Above minimum wage	0.80	0.87
	(0.40)	(0.34)
Written contract	0.47	0.47
	(0.50)	(0.50)
Social security	0.39	0.40
	(0.49)	(0.49)
Formality index	0.55	0.57
	(0.37)	(0.34)
Observations	555	1038

Panel B: Age	Younger than 30	30 or older
Above minimum wage	0.76	0.89
	(0.43)	(0.32)
Written contract	0.42	0.49
	(0.49)	(0.50)
Social security	0.23	0.47
	(0.42)	(0.50)
Formality index	0.47	0.61
	(0.34)	(0.35)
Observations	515	1078

Panel C: Education	Less than tertiary	Tertiary
Above minimum wage	0.77	0.91
	(0.42)	(0.29)
Written contract	0.31	0.61
	(0.46)	(0.49)
Social security	0.31	0.47
	(0.46)	(0.50)
Formality index	0.46	0.66
	(0.35)	(0.32)
Observations	759	831

Panel D: Experience	Up to 5 years	6+ years
Above minimum wage	0.82	0.89
	(0.39)	(0.31)
Written contract	0.45	0.50
	(0.50)	(0.50)
Social security	0.33	0.49
	(0.47)	(0.50)
Formality index	0.53	0.62
	(0.35)	(0.35)
Observations	973	618

Panel E: Supervisor role	Not a supervisor	Supervisor
Above minimum wage	0.79	0.92
	(0.41)	(0.27)
Written contract	0.43	0.53
	(0.49)	(0.50)
Social security	0.33	0.48
	(0.47)	(0.50)
Formality index	0.51	0.65
	(0.36)	(0.33)
Observations	966	627

Panel F: Relationship to employer	No relationship	Friends or family
Above minimum wage	0.87	0.81
	(0.33)	(0.40)
Written contract	0.55	0.35
	(0.50)	(0.48)
Social security	0.43	0.34
	(0.50)	(0.48)
Formality index	0.61	0.50
	(0.35)	(0.34)
Observations	910	653

Notes: The table describes baseline values by different employee characteristics.

Table A.6: Formality at baseline – Firm-level data

|	Minimum Wage	Written Contract	Social Security
No employee	10.27	52.90	33.93
Some employees	19.42	14.96	45.76
All employees	70.31	32.14	20.31
Total	100.00	100.00	100.00

Notes: The table shows the distribution of features of formality at baseline using employer reports.

Table A.7: Consistency checks at baseline

	Wages		Written Contract		Social Security	
	Control	Treatment	Control	Treatment	Control	Treatment
Panel A: All firms						
Consistent statements	0.63	0.65	0.79	0.80	0.72	0.75
Reported by employees only / higher	0.15	0.19	0.10	0.10	0.17	0.15
Reported by employers only / higher	0.22	0.16	0.11	0.10	0.12	0.10
Observations	124	182	129	192	162	219
Panel B.1: Firm size: < 3 employees						
Consistent statements	0.67	0.70	0.85	0.84	0.74	0.76
Reported by employees only / higher	0.15	0.14	0.07	0.09	0.15	0.12
Reported by employers only / higher	0.18	0.15	0.08	0.07	0.11	0.12
Observations	32	53	32	58	54	75
Panel B.2: Firm size: 4-6 employees						
Consistent statements	0.67	0.66	0.75	0.75	0.75	0.79
Reported by employees only / higher	0.15	0.22	0.13	0.11	0.17	0.12
Reported by employers only / higher	0.18	0.12	0.12	0.14	0.08	0.10
Observations	61	83	65	86	72	94
Panel B.3: Firm size: 6+ employees						
Consistent statements	0.51	0.59	0.80	0.86	0.61	0.67
Reported by employees only / higher	0.13	0.18	0.06	0.06	0.19	0.25
Reported by employers only / higher	0.35	0.23	0.13	0.08	0.19	0.08
Observations	31	45	32	47	36	48

Notes: The table reports the level of consistency between employer and employee statements at baseline. For each formality feature (minimum wage, written contract, social security) and separately for firms in treatment and control, it shows the average share where reports are consistent, the average share where employees report the benefit but employers do not, and the average share where employers report the benefit but employees do not.

Figure A.1: Cumulative distribution of compliance costs, as share of labor costs
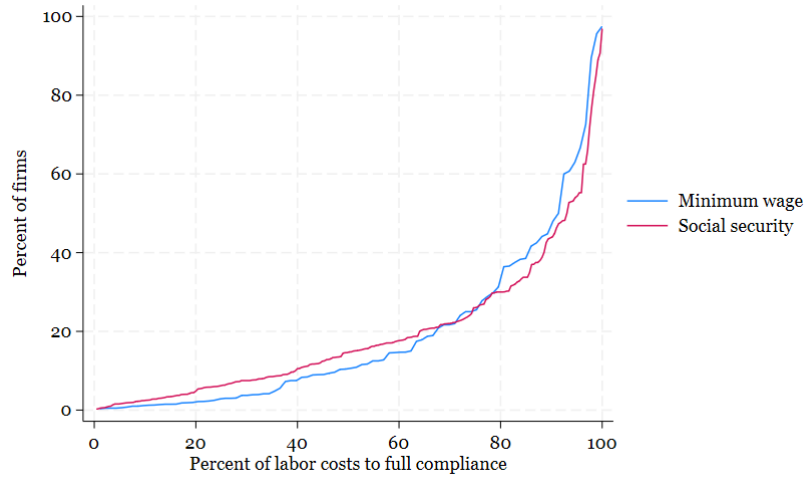
Notes: The graph shows the cumulative distribution of additional costs as a share of baseline labor costs to reach full compliance with minimum wage or social security regulations for all firms not already fully complying at baseline.

Table A.8: Formality at baseline by firm size and knowledge

Panel A: Number of staff	1-3 employees	4-6 employees	6+ employees
Above minimum wage	0.76	0.86	0.86
	(0.43)	(0.35)	(0.35)
Written contract	0.32	0.42	0.53
	(0.47)	(0.49)	(0.50)
Social security	0.26	0.36	0.44
	(0.44)	(0.48)	(0.50)
Formality index	0.45	0.54	0.60
	(0.34)	(0.33)	(0.36)
Observations	182	543	868

Panel B: Employer baseline knowledge	No knowledge	Moderate knowledge	High knowledge
Above minimum wage	0.72	0.85	0.94
	(0.45)	(0.36)	(0.24)
Written contract	0.26	0.46	0.64
	(0.44)	(0.50)	(0.48)
Social security	0.23	0.38	0.56
	(0.42)	(0.48)	(0.50)
Formality index	0.39	0.56	0.72
	(0.34)	(0.35)	(0.31)
Observations	311	891	391

Notes: The table shows baseline values by different firm characteristics.

Figure A.2: Implementation

A. Number of consultant visits

B. Recommendations given to firms
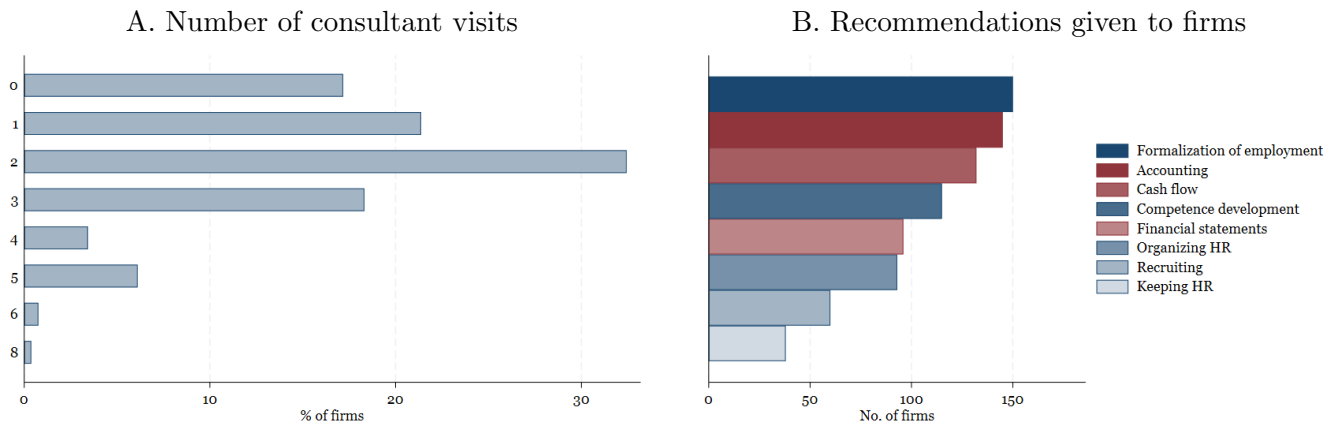
Notes: The figure reports the distribution of the number of consultant visits (Panel A) and the main recommendations given to firms by consultants (Panel B). Panel A: Self-reported information (260 cases) and administrative information (5 cases), for N = 265. Panel B: Recommendations for 181 firms, as recorded in monitoring data.

Figure A.3: Reasons why employers did not register any employees with CNPS
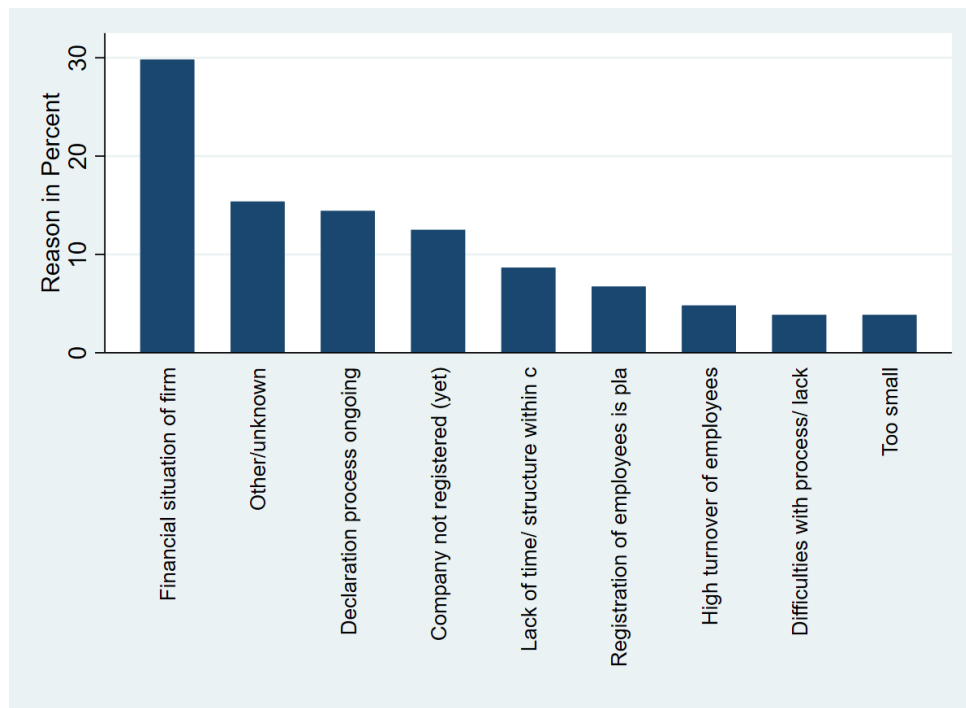
Notes: Reasons for non-registration of employees at CNPS.

Table A.9: Type of contract – Employee-level data

	Fixed-term contract			Permanent contract		
	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled
ITT	0.08***	0.04	0.06**	0.00	0.04	0.02
	(0.03)	(0.03)	(0.03)	(0.05)	(0.04)	(0.04)
R^2 0.129	0.134	0.116	0.250	0.223	0.236	
Mean	0.13	0.13	0.13	0.47	0.39	0.43
N	807	827	1634	896	827	1723

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

Notes: The table reports the β_1 coefficient from Model 1 using the type of contract as an outcome. Regressions include the lagged dependent variable and strata variables. The lagged dependent variable is standardized, with missing values set to zero and a dummy variable indicating missingness. Robust standard errors clustered at the firm-level are shown in parentheses.

Table A.10: Quantile regression analysis of wages

Quantile	10	20	30	40	50	60	70	80	90
ITT	6.909**	9.811**	8.324***	9.000***	9.339***	11.49***	12.63***	10.49	10.74
	(3.470)	(4.141)	(3.113)	(2.966)	(3.088)	(4.123)	(4.611)	(7.161)	(11.88)
N	1750	1750	1750	1750	1750	1750	1750	1750	1750

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

Notes: The table shows the percent increase in wages due to treatment assignment at different quantiles of the wage distribution, for the pooled data. Regressions include the lagged dependent variable and strata variables. The lagged dependent variable is standardized, with missing values set to zero and a dummy variable indicating missingness. Robust standard errors in parentheses.

Table A.11: Robustness – Consistency checks at mid- and endline

	Share where employer but not employee reports					
	Wage		Written Contract		Social Security	
	6 M.	18 M.	6 M.	18 M.	6 M.	18 M.
ITT	0.0181	-0.0247	-0.0338	0.0154	0.0822**	0.0173
	(0.0317)	(0.0392)	(0.0320)	(0.0221)	(0.0381)	(0.0397)
N	302	267	305	335	362	328
Mean	0.18	0.18	0.11	0.11	0.12	0.12

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

Notes: The table reports the β_1 coefficient from Model 2 using as an outcome variable the share of cases in which the employer reports a formality feature for a given employee while the employee does not. Regressions are at the firm level and include the lagged dependent variable and strata variables. The lagged dependent variable is standardized, with missing values set to zero and a dummy variable indicating missingness. Results are reported at 6 and 18 months post-treatment, with robust Huber/White standard errors in parentheses.

Table A.12: Robustness – Firm-level and weighted regressions

Panel A: Firm-level data

	Min. Wage (0/1)			Written Contract (0/1)			Social Security (0/1)			Formality Index (0-1)		
	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled
ITT	0.04	0.08**	0.06**	0.10**	0.09**	0.10***	0.07**	-0.00	0.04	0.07***	0.07***	0.07***
	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)	(0.04)	(0.03)	(0.02)	(0.03)	(0.02)
R^2	0.37	0.40	0.37	0.42	0.41	0.41	0.48	0.41	0.43	0.57	0.57	0.56
Mean	0.78	0.67	0.73	0.43	0.42	0.42	0.41	0.48	0.44	0.52	0.50	0.51
LATE	0.06	0.13**	0.09**	0.16**	0.14**	0.15***	0.11**	-0.00	0.06	0.11***	0.10***	0.11***
	(0.05)	(0.06)	(0.04)	(0.06)	(0.06)	(0.04)	(0.05)	(0.06)	(0.04)	(0.04)	(0.04)	(0.03)
R^2	0.21	0.23	0.22	0.31	0.27	0.29	0.40	0.30	0.34	0.43	0.38	0.40
Mean	0.81	0.71	0.77	0.48	0.45	0.46	0.44	0.50	0.47	0.56	0.53	0.55
N	346	303	649	373	360	733	383	349	732	385	360	745

Panel B: Employee data weighted to firm level

	Min. Wage (0/1)			Written Contract (0/1)			Social Security (0/1)			Formality Index (0-1)		
	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled	6 M.	18 M.	Pooled
ITT	0.06*	0.11***	0.08***	0.12***	0.09**	0.11***	0.04	0.04	0.04	0.09***	0.07***	0.08***
	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.03)	(0.02)	(0.03)	(0.02)
R^2	0.31	0.29	0.30	0.39	0.34	0.36	0.52	0.45	0.48	0.53	0.45	0.48
Mean	0.84	0.73	0.79	0.53	0.54	0.53	0.39	0.46	0.42	0.59	0.58	0.59
LATE	0.09*	0.17***	0.13***	0.20***	0.14**	0.17***	0.07	0.06	0.06	0.14***	0.11***	0.13***
	(0.05)	(0.06)	(0.04)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.03)
R^2	0.24	0.16	0.20	0.31	0.25	0.28	0.45	0.37	0.41	0.45	0.33	0.38
Mean	0.86	0.76	0.81	0.56	0.55	0.56	0.43	0.49	0.46	0.62	0.61	0.61
N	962	826	1788	977	876	1853	925	807	1732	980	879	1859

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

Notes: Panel A reports results using firm-level data. Panel B reports results with each employee observation weighted by the inverse of the number of observations per firm, in order to approximate firm-level results using employee-level data. Regressions include strata variables, the standardized lagged dependent variable with missing values set to zero and a dummy variable indicating missingness. Robust standard errors clustered at the firm-level are shown in parentheses.

Table A.13: Robustness – Sharpened q-values and Lee bounds

Panel A: Sharpened q-values

Outcome Variable	Coefficient	P-value	Sharpened q-value
6 M			
Min. Wage (0/1)	0.024	0.444	0.528
Written Contract (0/1)	0.070	0.064	0.348
Social Security (0/1)	0.037	0.227	0.413
Formality Index (0-1)	0.057	0.020	0.225
Wage (Log)	0.049	0.250	0.413
Satisfied (0/1)	-0.031	0.413	0.528
Hours worked	-1.504	0.202	0.413
Training Part. (0/1)	-0.037	0.355	0.528
Left Firm (0/1)	0.036	0.229	0.413
18 M			
Min. Wage (0/1)	0.111	0.002	0.021
Written Contract (0/1)	0.070	0.103	0.142
Social Security (0/1)	0.027	0.468	0.365
Formality Index (0-1)	0.067	0.018	0.060
Wage (Log)	0.141	0.021	0.060
Satisfied (0/1)	0.008	0.835	0.590
Hours worked	-0.463	0.722	0.565
Training Part. (0/1)	0.039	0.320	0.271
Left Firm (0/1)	0.069	0.083	0.142
Pooled Sample			
Min. Wage (0/1)	0.061	0.021	0.092
Written Contract (0/1)	0.070	0.053	0.094
Social Security (0/1)	0.030	0.285	0.211
Formality Index (0-1)	0.060	0.008	0.075
Wage (Log)	0.085	0.044	0.094
Satisfied (0/1)	-0.012	0.669	0.503
Hours worked	-1.078	0.304	0.211
Training Part. (0/1)	-0.002	0.955	0.643
Left Firm (0/1)	0.054	0.041	0.094

Panel B: Lee Bounds

Outcome variable	Lower bound	Upper bound	CI lower	CI upper
6 M				
Min. Wage (0/1)	0.012	0.026	-0.042	0.082
Written Contract (0/1)	0.060	0.082	-0.007	0.147
Social Security (0/1)	0.026	0.046	-0.027	0.099
Formality Index (0-1)	0.047	0.063	0.005	0.105
Wage (Log)	0.024	0.062	-0.045	0.133
Satisfied (0/1)	-0.048	-0.022	-0.113	0.044
Hours worked	-2.595	-0.452	-4.454	1.418
Training Part. (0/1)	-0.047	-0.021	-0.118	0.050
18 M				
Min. Wage (0/1)	-0.007	0.149	-0.059	0.211
Written Contract (0/1)	0.023	0.125	-0.051	0.195
Social Security (0/1)	-0.007	0.094	-0.073	0.153
Formality Index (0-1)	0.006	0.097	-0.038	0.144
Wage (Log)	0.037	0.252	-0.056	0.350
Satisfied (0/1)	-0.092	0.064	-0.150	0.127
Hours worked	-3.430	2.751	-5.448	4.658
Training Part. (0/1)	-0.004	0.147	-0.073	0.211

Notes: Panel A reports sharpened two-stage q-values calculated as described in Anderson (2008) and introduced in Benjamini *et al.* (2006). Results shown use the individual pooled data set. Panel B reports Lee bounds calculated using the `leebounds` Stata command introduced in Tauchmann (2014), based on the Lee (2009) approach. We report 90% confidence intervals. Regressions of primary outcomes include the firm size and locality by revenue as a tightening parameter.

Figure A.4: Quantile treatment effects on firm performance and productivity

Dep. var.: Revenue Dep. var: Profit

Dep. var.: Labor productivity Dep. var.: Labor costs

Coefficient
95% CI
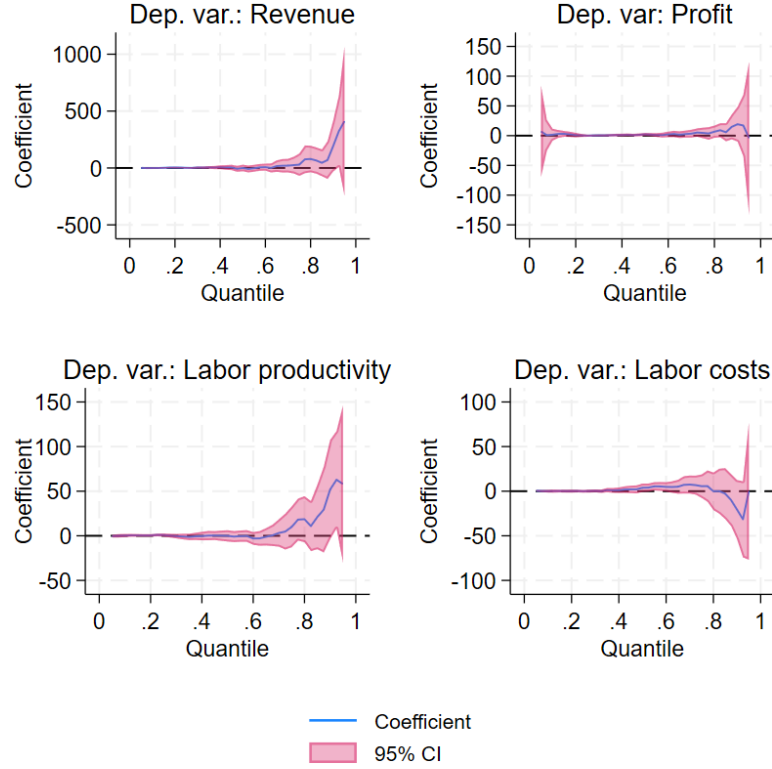
Notes: The figure reports quintile regression outcomes.

Table A.14: Knowledge – Firm-level data

	(1) No knowledge	(2) Moderate knowledge	(3) High knowledge
ITT	-0.0706**	0.0838*	-0.0132
	(0.0345)	(0.0475)	(0.0419)
N	390	390	390
Mean	0.22	0.53	0.25

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

Notes: The table reports the β_1 coefficient from Model 2 using employers' knowledge about the Ivorian labor code as an outcome variable. Regressions include the lagged dependent variable and strata variables. The lagged dependent variable is standardized, with missing values set to zero and a dummy variable indicating missingness. Effects are shown for six months post-treatment. Robust Huber/White standard errors in parentheses.

Table A.15: Mediation analysis

Wave	Statistic	Coefficient	Rob. Std. Err.	P-value	N
Panel A: Minimum Wage					
1	Indirect Effect	0.011	0.010	0.291	962
	Direct Effect	0.031	0.033	0.338	962
	Total Effect	0.042	0.030	0.157	962
2	Indirect Effect	0.027	0.016	0.094	826
	Direct Effect	0.086	0.040	0.033	826
	Total Effect	0.113	0.040	0.005	826
3	Indirect Effect	0.017	0.012	0.146	1788
	Direct Effect	0.057	0.030	0.059	1788
	Total Effect	0.074	0.028	0.009	1788
Panel B: Written Contract					
1	Indirect Effect	0.011	0.010	0.253	977
	Direct Effect	0.070	0.039	0.071	977
	Total Effect	0.081	0.037	0.028	977
2	Indirect Effect	0.028	0.016	0.077	876
	Direct Effect	0.037	0.043	0.392	876
	Total Effect	0.065	0.042	0.119	876
3	Indirect Effect	0.018	0.012	0.124	1853
	Direct Effect	0.054	0.037	0.141	1853
	Total Effect	0.072	0.035	0.040	1853
Panel C: Social Security					
1	Indirect Effect	0.003	0.006	0.612	925
	Direct Effect	0.029	0.031	0.349	925
	Total Effect	0.032	0.030	0.296	925
2	Indirect Effect	0.016	0.012	0.191	807
	Direct Effect	0.004	0.037	0.911	807
	Total Effect	0.020	0.036	0.574	807
3	Indirect Effect	0.008	0.008	0.316	1732
	Direct Effect	0.018	0.029	0.533	1732
	Total Effect	0.026	0.028	0.364	1732
Panel D: Formality Index					
1	Indirect Effect	0.006	0.005	0.283	980
	Direct Effect	0.057	0.025	0.021	980
	Total Effect	0.063	0.024	0.008	980
2	Indirect Effect	0.020	0.012	0.080	879
	Direct Effect	0.043	0.029	0.142	879
	Total Effect	0.063	0.029	0.030	879
3	Indirect Effect	0.011	0.008	0.146	1859
	Direct Effect	0.051	0.023	0.028	1859
	Total Effect	0.062	0.023	0.006	1859

Notes: The table reports results from a mediation analysis using the Stata 18 command `mediate`. The analysis examines whether the treatment effect operates through increased knowledge of labor regulations. The direct effect represents the treatment effect not operating through knowledge. The indirect effect captures the treatment effect that operates through increased knowledge. The total effect is the sum of direct and indirect effects. Knowledge measures understanding of labor regulations (0 = no knowledge, 1 = moderate or high knowledge).

Table A.16: Informal side-payments

	All	PAP-PME Treatment	PAP-PME Control
Estimated share	0.251***	0.203*	0.320***
	(0.0649)	(0.0833)	(0.102)
N	375	220	155

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The table reports the difference-in-means estimator from model 3. The sample consists of those employees registered at social security at endline. Robust standard errors clustered at the firm level are shown in parentheses.

Table A.17: Heterogeneous effects on probability of leaving firm

	Left firm
Panel A: By firm location	
Abidjan	0.0487
	(0.0489)
Mean	0.339
N	792
Outside Abidjan	0.0847
	(0.0544)
Mean	0.240
N	462
P-val. for diff. in coeff.	0.633
Panel B: By number of staff	
1-3 employees	0.00873
	(0.0813)
Mean	0.324
N	191
4-6 employees	-0.00566
	(0.0528)
Mean	0.276
N	459
6+ employees	0.132**
	(0.0602)
Mean	0.316
N	604
P-val. for diff. in coeff. 1 and 2	0.885
P-val. for diff. in coeff. 1 and 3	0.224
P-val. for diff. in coeff. 2 and 3	0.091

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: See notes for Table 4.