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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 an impact evaluation of a light-touch business consulting program with a focus on employment formalization in Côte d'Ivoire. Using a randomized controlled trial with 448 MSMEs and a unique employer-employee dataset, we find that the intervention led to employment formalization, driven by greater reported minimum wage compliance and an increase in written contract provision. We show suggestive evidence that these improvements were driven by selective formalization and increased awareness of regulation. The intervention's financial implications were moderate, with findings indicating that firms partially formalized previously informal payment streams, without a significant increase in total labor costs.

JEL Classification: O12, O17, J46, J81

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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 an impact evaluation of a light-touch and low-cost business consulting program with a focus on employment formalization in micro, small, and medium enterprises (MSMEs) in Côte d'Ivoire. The program aimed at improving business performance through better management practices and encouraged employers to consider the formalization of workers as a tool of better human resource management, for example to attract more talented individuals and help retain more productive employees. Such an approach towards formalizing employment might mitigate the potential unintended adverse effects on firm performance and workers.

To evaluate the impact of the program, 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 operated by the country's MSME agency (CI PME).[1] The consulting

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

intervention involved (i) an initial firm-level diagnostic and (ii) at least one personal visit by a professional consultant in which advice focused on financial and human resource management practices, particularly employment formalization.[2]

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 three 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. While minimum wage compliance was relatively high, with only 16% earning below the minimum wage, we find evidence that "informal side-payments" are common, with about a quarter of formal wages, i.e. those reported to the authorities, being augmented by informal payments.

Second, and relying on intention-to-treat (ITT) and local average treatment effects (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.

Next, we examine the mechanisms driving the observed impacts on formality and reported wages, focusing on four potential channels. First, we assess whether improve-

comes more closely.

[2]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.

ments in firm performance facilitated formalization. Our findings indicate that firms increased employment formalization without significant changes in profits. Second, we explore whether selective formalization served as a human resources (HR) management strategy, particularly to attract or retain talent. The results suggest that employers enhanced conditions for valuable workers, while overall workforce composition remained unchanged. Third, we investigate whether increased regulatory awareness influenced compliance. While firms gained a better understanding of labor regulations, this did not translate into an increased fear of enforcement. Finally, we examine whether greater formality resulted from 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, with subdued effects on 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.[3] 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 (Alvarez and Ruane, 2024; 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

[3]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.

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; Beber *et al.*, 2025), 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 a separate intervention type (business consulting) with a different objective (employment formalization) 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 *et al.*, 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.[4] 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 in the mid-range among West African countries (Diallo and Ronconi, 2024; Kanbur and Ronconi, 2018).[5] Côte d'Ivoire also mandates a minimum wage (MW), which was increased to FCFA 75,000 (≈ USD 139) in 2022 after remaining at FCFA 60,000 (≈ USD 111) for nine years.[6] 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.

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

[5]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.

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

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.[7]

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 Prévoyance 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 in April 2021,[8] corresponding to less than 10% of the labor force.[9]

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 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.[10]

[7]Based on ENSETE National Employment Survey data (Christiaensen and Premand, 2017).

[8]Minister for Employment and Social Security, Adama Kamara, quoted in Barro (2022).

[9]In 2021, Côte d'Ivoire had an estimated labor force of 8.9 million 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) covered by a separate social security scheme.

[10]The combination of stringent legislation and low inspection intensity is typical of francophone West

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 HR management and received business consulting between July and December 2021.

The PAP-PME program comprised individual consulting sessions over six months and a series of twelve webinars featuring external speakers. The consulting component was delivered by five Ivorian consulting firms. Upon receiving their assignments, consultants were briefed by CI-PME management on the program's objectives, with a strong emphasis on employment formalization. Following an in-depth diagnostic of each firm, consultants developed a structuring plan with tailored recommendations, which they discussed with firm managers. They then provided support to implement these recommendations, offering tools, information, and relevant contacts as needed. The number of visits was not predefined and varied by firm and consultant. Approximately 60% of firms received at least two visits, while around 30% received more than two (Figure A.2A).

HR management, particularly employment formalization, was a central focus of the business consulting. Formalization of employment was the main recommendation given to firms – 150 out of the 179 firms for which we have data on the exact recommendation received the advice to formalize their employees (Figure A.2B). Specifically, three

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.

key aspects were emphasized: paying at least the minimum wage, implementing written contracts, and ensuring social security registration.[11] An additional recommendation was the revision of salaries beyond minimum wage payments.

To encourage adoption, consultants highlighted the benefits of formal employment, emphasizing that offering higher-quality jobs can enhance employee loyalty and productivity. This, in turn, helps break the cycle of low formality, high turnover, and poor performance – challenges frequently cited by Ivorian SMEs, including lack of loyalty, misbehavior, and irresponsibility. Aligning with these recommendations, the webinars also covered topics on employee motivation, social security, and work contracts.

Overall, the implementation of the program was relatively low-cost, with an average of about 5 hours and 418 USD per firm.[12]

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.[13]

[11] Among treated firms with available data, 64% received a recommendation to provide employees with a written contract, 61% were advised to register employees with social security, and 12% were encouraged to pay at least the minimum wage. However, minimum wage compliance was already high at baseline – 63% of firms with implementation data were already paying all employees at least the minimum wage.

[12] Other consulting interventions, for example by Anderson and McKenzie (2022), involved around 88 hours and cost about 4,000 USD per firm.

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

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 (Perry *et al.*, 2007; Ulyssea, 2018). Lower-productivity firms that operate with low-profit margins can be expected to be more sensitive to costs associated with formal employment (Bobba *et al.*, 2021; Ulyssea, 2018). 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 (for theoretical arguments see, for example, Bobba *et al.* (2021); Ulyssea (2018) and for empirical evidence see, for example, Alvarez and Ruane (2024); Haanwinckel and Soares (2021)). 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 (for a discussion on administrative burden see Ohnsorge and Yu (2022)). In this framework, we think of the intervention to cause an increase in employee formality through several mechanisms.

Firm performance First, the intervention affects firm performance, i.e. productivity and costs. One of the objectives of the intervention was to improve firm performance and productivity through better financial and HR management. Such improved performance can lead to higher employment formality because higher revenues may now allow employers to pay minimum wages and grant social security. Furthermore, employment formalization may lead to increases in labor productivity, for example, due to increased motivation and higher loyalty to the firm, and hence, improved firm performance. As we explain in more detail below, we cannot empirically disentangle these two channels, but we can examine the impacts of the treatment on revenue, labor costs and labor productivity.

Selective formalization and workforce composition Second, we expect the treatment to improve HR management, using selective formalization and higher wages as instruments. Treated employers may selectively formalize elements of employment relationships with certain workers that they would like to retain or attract. Further, the

treatment may induce employers to use (higher) wages to enhance worker productivity, however, 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, who tend to exhibit more formal employment relationships. In this case, formal employment may increase without the firm 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 will have a stronger effect on firms with little knowledge, i.e. we expect greater effects for firms with lower baseline awareness. In addition, the increase in awareness potentially 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 important 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.[14] 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.

[14]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[15] 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.[16] Each of the five consulting firms was randomly assigned 50 firms. During the first months, 15 firms dropped out of the program and were replaced with firms from a waiting list selected using the same randomization procedure as described above.[17]

2.5 Data collection and quality

Timeline and data collection 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.[18,19] The midline survey (386 firms) took place between June and July 2022[20], and the endline survey (360 firms) in June and July 2023.

Data structure Due to the conduction of firm and employee interviews we have firm-level and employee-level information. The employee dataset covers contract situation, social security affiliation, salary, working hours, and working conditions, including paid

[15]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.

[16]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%.

[17]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.

[18]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).

[19]Note that in some cases employers did not allow employee interviews. We, therefore, do not have employees of all firms in the sample.

[20]Six months after treatment complementing (December 2021).

leave and job satisfaction. The firm dataset contains information on revenue, profits, costs,[21] 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 business consulting with a strong HR component 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 literature 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.8 shows reporting discrepancies between firm owners and employees at baseline. For wages, 64% of statements matched, with employees reporting higher wages in 17% and employers reporting higher wages in 18% of cases.[22] For written contracts, 80% of statements matched, with an equal 10% discrepancy rate for both employer and employee reporting (Table A.8). For social security affiliation, 73% of statements were consistent, with employers reporting higher affiliation in 11% and

[21] For revenue, profits, and costs, we asked for the balance sheets of the previous year. Accordingly, we have information on firm performance up until 2022.

[22] Note that wages reported by employees registered in the social security system likely reflect formal wages, without accounting for potential informal side payments.

employees reporting higher affiliation in 16% of cases (Table A.8).[23]

Analysis by firm characteristics reveals that reporting consistency differed by some firm characteristics.[24] 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.4 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 had a written contract, and 39% were registered with the social security provider CNPS. The average monthly wage was FCFA 140.000 (around USD 260), with 84% earning at least the minimum wage of FCFA 60.000 (around USD 111) and respondents worked 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 had some supervisory responsibility, with an average of 3.5 persons supervised. Respondents had an average experience of six years in the sector and had 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 was higher among workers that are potentially more valuable to firms, such as employees with tertiary

[23]For social security contribution data, the comparison required grouping firm-level and employee-level data into three categories, as employers did not report individual registration status but rather the overall share of registered employees.

[24]Wage consistency dropped to around 55% in firms with over six employees, with employers reporting higher wages. Contract consistency was lower in firms with 4-6 employees. Larger firms showed lower social security consistency.

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.

education and supervisory responsibilities (Table A.6).[25] 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.10). Finally, we see that individuals without personal relationships with their employers were more likely to be formal at baseline (Table A.6).

The firm-level baseline data shows patterns regarding the distribution of benefits. A majority of firms (67%) paid all employees at least minimum wage, while only 11% paid below minimum wage to all workers. Written contracts show an opposite pattern: 48% of firms provided no contracts, while 34% offered contracts to all employees. Social security registration presents a more varied distribution: 20% of firms registered all employees, 34% registered none, and 46% registered a portion of their workforce (Table A.7).

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 classifi-

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

cation is that consultants finalized their diagnostic during the first visits, whereas concrete recommendations were made during additional visits. As shown in Table A.4, there are some significant differences in 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 part of the firm sample.[26,27] Out of those, we were able to interview 1106 employees in 2022 and 1055 in 2023.[28] 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.[29] In some

[26]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.

[27]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.

[28]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.

[29]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.

cases, employers withheld permission for us to interview 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.2) which we will consider in our analysis.

3 Results

3.1 Empirical strategy

In our main specification, we estimate the ITT effects at the employee-level using a standard analysis of covariance (ANCOVA) specification:

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

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[30] 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

[30]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.

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.[31]

Other outcomes of interest going beyond employment formality are log monthly reported wages in 1000' FCFA,[32] 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 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 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

[31] 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.

[32] Note that reported wages are generally speaking formal wages, without informal side payments, in particular for workers registered at the CNPS.

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 or firm location – as well as employee characteristics – such as the status of an employee (new vs. old), the experience level of an employee or the education level of an employee.

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 business consulting took place, 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,[33] 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 was initially driven by fixed-term rather than permanent contracts (Table A.11), but after 18 months was equally attributable to increases in both types.[34] 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 were 17 pp more likely to earn at least the minimum wage.

[33]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.

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

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.

3.3 Additional Results

Wages Looking beyond the binary indicator for minimum wage compliance, we find positive treatment effects on reported 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 regression looking at the entire wage distribution shows that the treatment effects were positive for all deciles, mostly significant, and largest at the 70th percentile (Table A.12), 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.[35]

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).[36] 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 were similarly likely to quit their job voluntarily, and their risk of being laid off remained comparable to those in control firms. When examining heterogeneous effects in Table A.19, we find that employees in larger treatment firms (those with more than 6 employees) were more likely to exit their job than those in relevant control group firms.

[35] Table A.1 in the Appendix shows selected heterogeneities regarding main outcomes and wages. The effect do not differ statistically significantly between males and female, workers with up to 5 years of experience have a higher probability of receiving written contracts and higher wages. New employees have a higher probability of receiving at least the minimum age and workers working in firms outside Abidjan, which is the economic-center of the country have a higher probability to receive at least the minimum wage, a written contracts, and higher wages in general.

[36] 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.

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), shown in Panel A of Table A.15, 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 little differential attrition across treatment and control groups. The baseline share of employees in treated firms (62%) is very close 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.2) and at the firm level (Table A.5).

Third, we calculate Lee bounds (Lee, 2009). Lee bounds provide treatment effect estimates in the presence of selective attrition by trimming the less attrited group's outcome distribution to match the more attrited group's attrition rates. The bounds assume treatment affects selection monotonically and are calculated by removing observations from the top and the bottom of the outcome distribution, respectively. Results are reported in

Panel B of Table A.15. All significant effects reported in Table 2 are positive, and they all remain positive at the bounds. We additionally report Imbens and Manski (2004) confidence intervals around these bounds, and effects on the formality index at six and 18 months remain significant.

Consistency with employer reports Are our employee-level results consistent with available firm data? Panel A of Table A.14 re-runs the main analysis using (employer-reported) firm-level data.[37] 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 – even though the formality index loses slightly in significance. Panel B reports employee-level data weighted to the firm level, giving each firm the weight of 1. Here, effects appear generally larger and more significant, suggesting that treatment effects are driven by small rather than large firms.[38] This interpretation is supported by heterogeneity analyses in Table 5, which shows larger effects for smaller firms.[39]

4 Mechanisms

Next, we study the mechanisms through which the business consulting intervention could have improved formality and wages as outlined in our theory of change in Section 2.3.

[37]Note that the firm-level regression includes more firms than the employee-level regression. This discrepancy arises because some employers, while reporting formality benefits for their employees, did not grant permission to interview the respective employees. As a result, these firms appear in the employer dataset, but their employees cannot be included in the employee dataset. Nonetheless, the results in Table A.14 remain robust (not shown) when restricting Panel A to the firms included in the employee regression (Panel B).

[38]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.

[39]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.14), 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 employees. Table A.13 confirms this with a significant short-term effect on employers reporting higher social security affiliation, but no long-term or systematic over-reporting.

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 shed some light on employers' decisions to grant higher degrees of formality and wages.

Firm performance We start by dissecting the effects of the intervention on revenue, labor productivity, labor costs, and profits. Two notes of caution are in order for the subsequent analysis. First, the firm-level data on revenue and costs from the firms' balance sheets are available only up to 2022, including the full baseline year (2021) and the subsequent year (2022). As the intervention was implemented between July and December 2021, it might have taken time for the effects to settle in rendering its potential impacts on the 2022 annual outcomes muted. Second, note again that we cannot disentangle whether performance drives formalization or vice versa.

It turns out, however, that the treatment hardly affected firm performance. Average treatment effects reported in Table 3 show that the program did not have any significant average effects on revenues in the year following the intervention.[40] This also holds for labor productivity, proxied by revenue per worker.[41] These results imply that formalization is unlikely to be associated with notable increases in worker productivity, as employers might have hoped for. However, neither does the intervention significantly increase labor costs despite its positive formalization impacts (see Table 3), at least when considering the balance sheet data. As expected, we can detect a positive but moderate effect on the wage bill that we can compute from our employee-level data from 2023 (Table A.9). Based on these findings on revenue and costs from the balance sheets, it is not surprising that we can find, if anything, a small positive impact of the intervention on profits that is significant only when using the inverse hyperbolic sine transformation of profits.

Muted effects on costs and profits over the 18-months time horizon are consistent with

[40] Heterogeneity analysis shows positive effects on profits and productivity in firms with more than six employees. Our main effects on formality, however, are concentrated in firms with up to three employees (Table 5).

[41] We also find no effects on aggregate employment in the year after the intervention.

Table 3: Firm-level treatment effects

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

formalization that is desirable for employees and that entails potential longer-term productivity gains for firms. Some back-on-the envelope calculations illustrate this. Many firms that were not paying minimum wage could achieve full minimum wage compliance with relatively moderate labor cost increases – 44% of non-compliant firms would need to increase labor costs by less than 10%, while 18% would require a 10–20% increase.[42] In contrast, full compliance with social security is more costly and administratively burdensome, with 40% of non-compliant firms requiring a labor cost increase of up to 10%, 24% needing 10–20%, and 36% facing an increase of more than 20% (Figure A.1).[43] In addition to monetary costs, employee registration also entails administrative burdens and represents a more binding commitment.[44] Those considerations are consistent with the effect on paying at least the minimum wage and the muted effects on social security affiliation.

Selective formalization We next examine whether employers selectively formalized elements of employment relationships with workers whose characteristics are likely to make them more valuable to the firm and whom employers would therefore like to retain or attract. This may be particularly relevant for less common or "higher-value" elements of formality, such as written contracts and social security. Similarly, employers may use wage increases beyond the legally required minimum to motivate such valuable workers.

To study the selective formalization channel, we first analyze whether treatment effects on 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 (Table 4).[45] The results provide 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, but somewhat larger and (weakly) significant treatment effects for those with tertiary educa-

[42] Non-compliant minimum wage firms correspond to approximately 33% of all firms.

[43] Non-compliant social security firms correspond to approximately 80% of all firms.

[44] 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.

[45] Predictions are made using the following baseline characteristics: gender, relationship to the employer, experience (linear and squared), supervisor status, and education level.

Table 4: Heterogeneous effects by employee characteristics

	Minimum Wage	Written Contract	Social Security	Formality Index	Log. Wage
Panel A: Employee Education					
Tertiary	0.043	0.098*	0.031	0.061*	0.138**
	(0.029)	(0.050)	(0.050)	(0.032)	(0.061)
Mean	0.903	0.658	0.510	0.703	5.002
N	563	583	516	584	552
Less than Tertiary	0.070**	0.054	0.030	0.059**	0.056
	(0.033)	(0.044)	(0.031)	(0.026)	(0.049)
Mean	0.719	0.457	0.376	0.517	4.554
N	1225	1270	1216	1275	1198
P-val. for diff. in coeff.	0.478	0.464	0.975	0.951	
Panel B: Age					
30 or older	0.033	0.033	0.022	0.036	0.045
	(0.028)	(0.038)	(0.030)	(0.023)	(0.048)
Mean	0.827	0.562	0.481	0.628	4.816
N	1291	1345	1242	1349	1257
Younger than 30	0.121***	0.157***	0.040	0.110***	0.149***
	(0.045)	(0.057)	(0.052)	(0.039)	(0.057)
Mean	0.691	0.458	0.298	0.488	4.503
N	493	503	485	505	489
P-val. for diff. in coeff.	0.071	0.039	0.747	0.074	0.100
Panel C: Supervisory Role					
Supervisor	0.055**	0.086*	0.057	0.076***	0.118**
	(0.024)	(0.044)	(0.039)	(0.026)	(0.047)
Mean	0.884	0.599	0.497	0.664	4.932
N	773	803	742	808	759
No Supervisor	0.066*	0.056	0.008	0.047*	0.060
	(0.035)	(0.042)	(0.032)	(0.027)	(0.053)
Mean	0.710	0.476	0.363	0.522	4.547
N	1010	1044	984	1045	986
P-val. for diff. in coeff.	0.741	0.521	0.240	0.310	0.298
Panel D: Relationship with Employer					
Friends or Family	0.057	0.015	-0.001	0.025	0.042
	(0.039)	(0.060)	(0.042)	(0.035)	(0.054)
Mean	0.752	0.487	0.394	0.552	4.656
N	569	587	554	590	542
No relationship	0.033	0.083**	0.058	0.066**	0.031
	(0.028)	(0.041)	(0.037)	(0.026)	(0.046)
Mean	0.857	0.629	0.534	0.677	4.853
N	682	707	656	708	673
P-val. for diff. in coeff.	0.583	0.291	0.281	0.298	0.864
Panel E: 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 5. In Panel E predictions are made using the following baseline characteristics: gender, relationship to the employer, experience (linear and squared), supervisor status, and education level.

tion and in supervisory roles (9.8 and 8.6 pp respectively). The patterns are similar for wages (Table 4), 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 wage distribution (Table A.12).

Furthermore, personal characteristics of employees condition the impacts of the intervention, which is suggestive of selective formalization. Treatment effects are stronger (and, in fact, only significant) for employees who are neither friends nor family members. We also find stronger effects on younger and more recently employed workers (Table 4).

As outlined in the theory of change, we also examined whether the observed formalization effects are really due to job upgrading and not driven by a mere workforce composition effect – through selective attrition, selective hiring, or churning – that could be an alternative explanation for these results, for example, if employers hired more qualified workers. Our results reject this alternative channel. 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.2)[46] which is also reflected in the composition of new hires (Table A.3). 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 Here, 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 knowledge improvements, we find that the treatment improved employers' knowledge of labor regulations, with the share of managers who improve their knowledge from no to moderate knowledge of the labor code increasing by 8.3 pp (Table A.16). Second, mediation analysis cautiously indicates that these increases from "no knowledge" to "moderate or high knowledge" explain – even though statistically insignificantly or marginal significantly – 22% of the effect on min-

[46]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.

Table 5: Heterogeneous effects by firm size

	Minimum Wage	Written Contract	Social Security	Formality Index	Log. Wage
Panel A: Number of Staff					
1-3 employees	0.150**	0.195**	0.090	0.150**	0.199*
	(0.071)	(0.094)	(0.072)	(0.063)	(0.106)
Mean	0.706	0.402	0.310	0.477	4.501
N	272	284	268	285	267
4-6 employees	0.066*	0.023	0.056	0.056	0.116*
	(0.038)	(0.058)	(0.048)	(0.036)	(0.064)
Mean	0.767	0.559	0.376	0.572	4.657
N	684	710	659	712	660
6+ employees	0.032	0.073	-0.003	0.036	0.038
	(0.039)	(0.051)	(0.043)	(0.032)	(0.064)
Mean	0.825	0.547	0.493	0.628	4.831
N	832	859	805	862	823
P-val. for diff. in coeff. 1 and 2	0.288	0.112	0.701	0.193	0.501
P-val. for diff. in coeff. 1 and 3	0.143	0.259	0.282	0.120	0.193
P-val. for diff. in coeff. 2 and 3	0.523	0.515	0.379	0.690	0.374

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

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.

imum wages and 25% of the effect on written contracts (Table A.17).[47] Third, there is some indication that increased knowledge played a role in higher compliance with minimum wages. This is because treated firms increased wages in line with the legal minimum wage, which was raised between our second and third data collection. In contrast, the control group had not adjusted wages after 18 months, probably indicating that firms in this group were less aware of legislative changes (Table 2).

Greater awareness may also increase the fear of detection and enforcement. If formalization were driven by such concerns, we would expect stronger treatment effects where the costs of non-compliance are high – that is, where firms face a greater likelihood of inspection and substantial fines or back payments. Literature and expert interviews suggest this is particularly relevant for larger firms, especially regarding social security compliance.[48] However, we do not find empirical support for increased fear of detection.

[47] Additionally, we observe that employers who did not previously have experience with written contracts and social security start providing them (Table 5), although the effects are not statistically significant.

[48] Moreover, the effect is expected to be stronger in firms that have already registered at least one employee. Such firms are registered with the social security agency and are therefore subject to potential

First, we do not find effects on social security registration, second, the positive effects on minimum wage payments, written contracts, and wages are concentrated in smaller firms (Table 5), and third, firms already on the inspection roster (having at least one registered employee at CNPS) do not have a higher probability of formalization (Tables 2 and 5).

Reducing informal side-payments Finally, we examine the practice of informal side payments. A relatively new literature shows that employers often under-report wages to authorities – such as the social security agency – to reduce payroll tax obligations. In other words, only a portion of the wage is officially declared, while the remainder is paid in cash as an off-the-books supplement (Feinmann *et al.*, 2022).[49] We implement a double-list experiment to assess whether informal side-payments are also 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.[50]

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:

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

where $P(S_i = 1)$ is the probability of a respondent answering affirmatively to the

inspection.

[49] Although evidence on this practice is limited, anecdotal reports suggest that these payments may not always be made monthly but can also take the form of bonuses or other irregular compensation.

[50] 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.

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.[51]

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 presented with the longer list select 0.25 more items than individuals presented with the shorter list, meaning an estimated 25% of individuals receive higher wages in cash than indicated on their payslips (Table A.18). Heterogeneity analysis suggests that the practice of informal side-payments is more common in small- and medium-sized firms.[52]

Given the short-term increase in employers' over-reporting of social security registration following our consulting intervention (see Section 3.4), 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 treatment and control groups. Yet, exploative heterogeneity analysis using the endline data suggests that informal side-payments in the PAP-PME control group are higher than in the treatment group (32% vs. 20%). The treatment thus 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, i.e. in the firms with the strongest treatment effect on wages. We therefore tentatively conclude that the treatment did not increase informal side-payments but rather formalized informal payment streams. This is consistent with the increase in reported wages, i.e. in wages excluding informal side-payment for the formally employed (see Section 3).

It should be kept in mind that this formalization of payments comes with additional costs for employers through increased social security contributions of around 22%-25%

[51] We implement this using 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.

[52] Those findings are broadly in line with Feinmann *et al.* (2024) who find that payments under the table decrease with firm-size. However, Feinmann *et al.* (2024) look at firms with up to 5,000 employees.

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.[53] So again, the cost increase is rather moderate and apparently outweighs the perceived current and future benefits to firms and employees.

5 Conclusion

Informal employment prevails in many MSMEs in Sub-Saharan Africa. This paper investigates the impact of a light-touch low-cost business consulting focused on employment formalization in Côte d'Ivoire. The impact evaluation relies on a randomized controlled trial and a unique data structure – matched employer-employee data. Our main results show a significant increase in minimum wage compliance and written contracts in treated MSMEs.

Our analysis explores several mechanisms behind these improvements. First, improved firm performance caused by our intervention is unlikely to explain the observed effects. However, there is suggestive evidence that firms formalized employment in anticipation of higher productivity and performance. Formalization was selective, with heterogeneity analysis indicating that firms extended formal employment to workers they aimed to retain or attract. Yet, we find no evidence of changes in workforce composition. Awareness of labor regulations likely played a role for formalization, but the intervention did not translate into greater fear of enforcement. Additionally, treated firms appear to have formalized informal side-payments streams, which we can show through a list experiment.

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 notable adverse effects on firms' revenue or profits. Our

[53] 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.

findings implicitly suggest that the employees value certain benefits of formality. The non-coercive intervention appears to induce employment formalization that is perceived to be beneficial to both firms and employees. This is in contrast to previous findings on other more coercive types of interventions that increase the costs of non-compliance or reduce compliance costs. While such interventions may also lead to more formalization, the associated change in costs is oftentimes associated with reductions in real wages, layoffs, or firm exits. The presented evidence in this paper suggests that firms may be willing to provide more formal employment when provided with tailored information and advice on formalization. This approach may work best where firms have room to adjust formality (or elements of formality) at the intensive margin, as in the Ivorian context, but this could also be subject to future research.

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Table A.1: Additional heterogeneous effects

	Minimum Wage	Written Contract	Social Security	Formality Index	Log. Wage
Panel A: Gender					
Male	0.051*	0.070*	0.029	0.056**	0.067
	(0.027)	(0.039)	(0.033)	(0.024)	(0.044)
Mean	0.817	0.517	0.434	0.591	4.802
N	1123	1170	1093	1175	1100
Female	0.079**	0.068	0.033	0.065*	0.114*
	(0.037)	(0.054)	(0.041)	(0.033)	(0.064)
Mean	0.735	0.556	0.403	0.576	4.582
N	665	683	639	684	650
P-val. for diff. in coeff.	0.439	0.979	0.923	0.795	0.473
Panel B: Experience					
6+ years	0.036	0.021	0.033	0.035	0.023
	(0.030)	(0.042)	(0.032)	(0.025)	(0.054)
Mean	0.828	0.565	0.506	0.640	4.876
N	942	974	907	979	912
Up to 5 years	0.087***	0.120***	0.023	0.083***	0.133***
	(0.033)	(0.046)	(0.041)	(0.030)	(0.051)
Mean	0.742	0.499	0.343	0.531	4.566
N	843	876	822	877	835
P-val. for diff. in coeff.	0.149	0.058	0.829	0.142	0.075
Panel C: Employment Status					
Old Employee	0.040	0.055	0.036	0.051**	0.062
	(0.026)	(0.038)	(0.028)	(0.023)	(0.043)
Mean	0.812	0.554	0.459	0.613	4.775
N	1493	1547	1441	1553	1455
New Employee	0.172***	0.147**	-0.000	0.107**	0.196**
	(0.055)	(0.067)	(0.064)	(0.047)	(0.090)
Mean	0.650	0.413	0.235	0.438	4.443
N	295	306	291	306	295
P-val. for diff. in coeff.	0.015	0.178	0.562	0.230	0.134
Panel D: Location					
In Abidjan	0.019	0.010	0.019	0.018	0.008
	(0.024)	(0.044)	(0.036)	(0.026)	(0.050)
Mean	0.895	0.684	0.490	0.695	5.017
N	1065	1105	1019	1109	1032
Outside Abidjan	0.148***	0.154***	0.034	0.121***	0.230***
	(0.054)	(0.054)	(0.046)	(0.036)	(0.074)
Mean	0.625	0.304	0.324	0.422	4.298
N	723	748	713	750	718
P-val. for diff. in coeff.	0.034	0.044	0.785	0.023	0.017

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

Notes: See notes for Table 5.

Table A.2: 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.3: 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.4: 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.5: 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.6: 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.7: Formality at baseline – Firm-level data

	Minimum Wage	Written Contract	Social Security
No employee has benefit	11.47	48.91	34.08
Some employees have benefit	21.70	16.30	45.96
All employees have benefit	66.83	34.79	19.96
Total	100.00	100.00	100.00

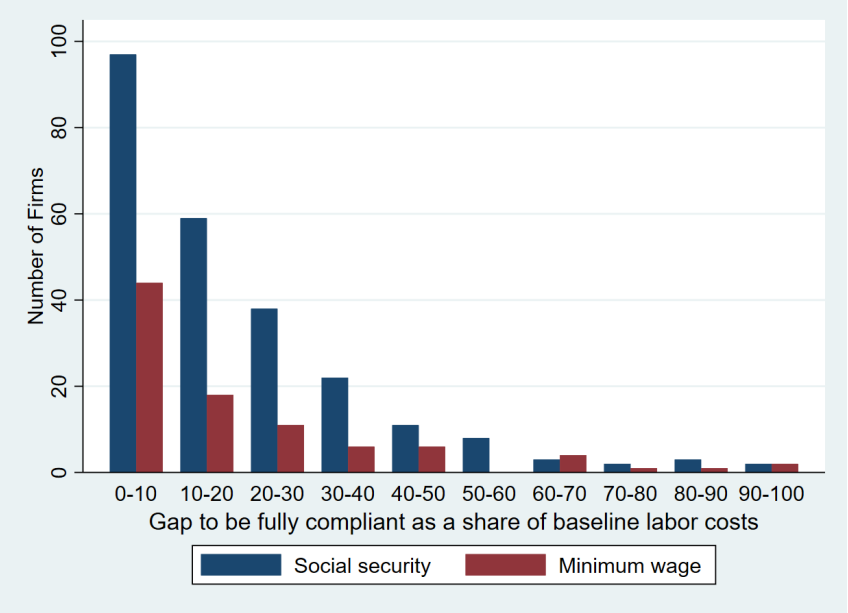
Notes: The table shows the distribution of features of formality at baseline using employer reports.

Table A.8: 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: Distribution of compliance costs, as share of baseline labor costs



Notes: The graph shows the 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. N minimum wage gap = 101; N social security gap = 245.

Table A.9: Impact on wage bill at endline

	(1) Wage bill	(2) Wage bill p.w.
ITT	0.80	15.34*
	(43.85)	(9.09)
N	271	271
R^2	0.55	0.66
Mean	476.06	141.62

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

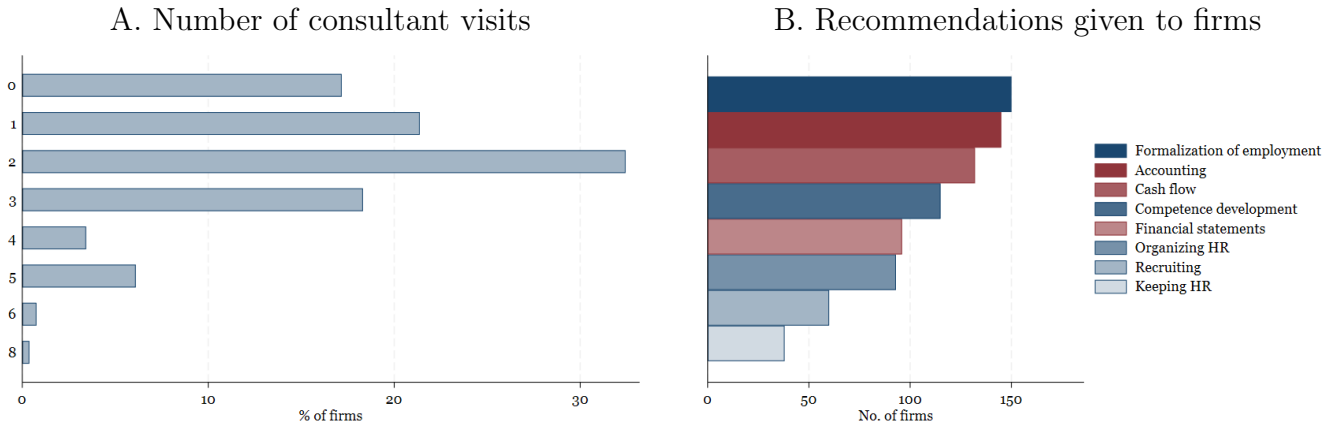
Notes: The table reports the β_1 coefficient from Model 2 with wage bill and wage bill per worker at endline as outcome variables. The wage bill represents the sum of total wages by firm reported by each worker. Robust standard errors are shown in parentheses.

Table A.10: 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



Notes: The figure reports the distribution of the number of consultant visits (Panel A) and recommendations given to firms by consultants (Panel B). Recommendations on formalization included ensuring minimum wage compliance, providing written contracts, registering employees with social security, and offering medical insurance and safety equipment. Panel A: Self-reported information (260 cases) and administrative information (5 cases), for N = 265. Panel B: Recommendations for 179 firms, as recorded in monitoring data.

Table A.11: 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.12: Treatment effect on wages throughout the wage distribution

Percentile	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 percentiles 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.13: Robustness – Consistency checks at mid- and endline

	Share where employer but not employee reports					
	Specific Wage Bracket		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.14: 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**	0.12***	0.09*	0.10***	0.07**	-0.00	0.04	0.07***	0.05*	0.06***
	(0.03)	(0.04)	(0.03)	(0.04)	(0.05)	(0.04)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.02)
R^2	0.37	0.40	0.37	0.44	0.42	0.42	0.48	0.41	0.43	0.53	0.49	0.50
Mean	0.78	0.67	0.73	0.49	0.48	0.48	0.41	0.48	0.44	0.55	0.54	0.54
LATE	0.06	0.13**	0.09**	0.19***	0.13*	0.16***	0.11**	-0.00	0.06	0.12***	0.08*	0.10***
	(0.05)	(0.06)	(0.04)	(0.07)	(0.07)	(0.05)	(0.05)	(0.06)	(0.04)	(0.04)	(0.04)	(0.03)
R^2	0.21	0.23	0.22	0.34	0.29	0.31	0.40	0.30	0.34	0.41	0.31	0.35
Mean	0.81	0.71	0.77	0.53	0.51	0.52	0.44	0.50	0.47	0.58	0.57	0.58
N	346	303	649	332	312	644	383	349	732	384	359	743

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.15: 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)	0.019	0.064	–0.022	0.100
Written Contract (0/1)	0.059	0.095	0.008	0.146
Social Security (0/1)	0.021	0.049	–0.020	0.090
Formality Index (0–1)	0.049	0.074	0.016	0.106
Wage (Log)	–0.013	0.128	–0.067	0.180
Satisfied (0/1)	–0.043	–0.009	–0.094	0.041
Hours worked	–2.810	0.088	–4.250	1.404
Training Part. (0/1)	–0.060	–0.024	–0.114	0.031
18 M				
Min. Wage (0/1)	0.040	0.137	–0.001	0.185
Written Contract (0/1)	0.045	0.090	–0.012	0.147
Social Security (0/1)	0.004	0.053	–0.047	0.103
Formality Index (0–1)	0.037	0.084	0.001	0.120
Wage (Log)	0.057	0.216	–0.017	0.292
Satisfied (0/1)	–0.039	0.042	–0.085	0.089
Hours worked	–2.715	1.890	–4.256	3.345
Training Part. (0/1)	0.019	0.093	–0.033	0.142

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.

Table A.16: Knowledge – Firm-level data

	(1) No knowledge	(2) Moderate knowledge	(3) High knowledge
ITT	-0.0832**	0.0879*	-0.00471
	(0.0343)	(0.0475)	(0.0427)
N	389	389	389
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.17: 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.18: 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 given by equation 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.19: 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 5.