Labor-Management Relational Capital*

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Abstract

Using novel survey data from randomly selected establishments, which include common questions posed to employees and management about their relationship, we show that good labor relations enhance profitability, labor productivity, and employee retention. We measure relational quality by comparing employee responses to those of management and leverage its within-stratum-year variation, which is random conditional on the balance of covariates and outcomes in predicting outcomes in the following survey year. Neither employee nor management responses alone predict outcomes, implying the importance of assessing bilateral ESG factors, such as labor relations, based on input from both parties. The effects are more pronounced in establishments with lower relational quality and those investing in the human capital of rank-and-file employees.

JEL classification: G32, J24, J53, M14
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1 Introduction

This paper examines whether it pays to invest in labor relations. While labor is often assumed to be no different than capital and supplied in a frictionless market, in reality, employees face friction and engage in strategic behavior (Matsa (2018)). As a result, labor relations of higher quality may induce employees to exert greater effort than what is explicitly contracted through wages, non-wage benefits (Liu et al. (2023)), or insurance (Ellul et al. (2018)). They may also influence employees' perceived value of remaining with their current employer compared to joining a similar firm (Nishesh et al. (2022)). Addressing this research question faces two challenges. First, the intangible nature of labor-management relationships makes it difficult to measure their quality. Second, establishing casual relationships by randomly allocating varying levels of the intangible is equally challenging. To overcome these obstacles, we utilize data from the Workplace Panel Survey (WPS), conducted by the Korea Labor Institute (KLI). It allows us to measure the *perception of labor-management relational quality by employees relative to management* (hereafter, relational quality) and exploit its within-sampling-unit variation to analyze how randomly allocated relational quality influences future business outcomes.

Using the proxy and research design, we show a positive association between relational quality and future profitability, labor productivity, and employee retention. Notably, this association is not unobserved when considering the perception of employees or management alone. This finding carries two implications. First, the evaluation of bilateral intangible factors, such as labor relations, should incorporate input from both parties involved. In the absence of data enabling such a bilateral evaluation, previous studies and environmental, social, and governance (ESG) rating agencies alike have predominantly evaluated these factors unilaterally, relying solely on either employee or management perspectives gathered through surveys (Edmans (2011), Guiso et al. (2015), Graham et al. (2022)) or information disclosed by management through regulatory filings or websites (Bae et al. (2011))[1]. Second, relational quality, closely intertwined with corporate culture (Gorton et al. (2022)) and influencing employee satisfaction (Edmans (2011), Shan and Tang (2023)), has the potential to increase value in the long run and be viewed as *relational capital*[2].

The WPS is conducted on establishments that are randomly selected to represent strata based on industry, region, and size. The survey includes eight common questions asked to employees and management about their relationship, and respondents – namely the union representative and human resource (HR) manager – provide

[1] For example, MSCI ESG KLD ratings, commonly used to measure labor relations (e.g., Landier et al. (2009), Turban and Greening (1997)), rely on information from company disclosures, media sources, government agencies, and nongovernment organizations.

[2] Relational quality can be likened to a technology that determines the efficiency of converting labor input into output.

their answers on behalf of employees and management using a three-to-five-point scale[3]. Four of these questions focus on cultural dimensions, such as joint decision-making, while two pertain to policies or attitudes toward each other. The remaining two questions address the occurrence of disputes. The data also includes information about financial status, financial performance, employment, compensation, job training, wage negotiation, and actions taken against management. The sample period is from 2005 to 2019.

To quantify relational quality, we first calculate the difference between employee and management responses for each of the eight questions. We then compute the principal components (PCs) of these score differences. Among these PCs, we pick the first one, whose eigenvalue is 3.30 and well above one, as our proxy for relational quality[4]. Unlike existing measures that solely represent one party's responses, the proxy captures the reality that employees form their perception using managerial perception communicated within the organization as a benchmark. It thereby reflects employees' relative perception of relational quality, which may go unnoticed by management and potentially lead to unexpected future performance. Additionally, we separately compute the first PCs of employee and management scores as measures of employee-perceived and management-perceived relational quality, respectively. We use them to examine whose perception accounts for the variation in relational quality and its association with establishment outcomes between employees and management. Our approach aligns with Gorton and Zentefis (2022), who model observed culture (comparable to employee-perceived relational quality, or employee ratings in Edmans (2011)) as the combination of the CEO's desired culture (resembling management-perceived relational quality, or proclaimed values in Guiso et al. (2015)) and employees' interpretation of the desired culture (comparable to relational quality).

Our identification strategy exploits within-stratum-year variation in relational quality, which is random among establishments drawn via stratified random sampling, as long as relational quality is uncorrelated with other establishment characteristics. Specifically, we model establishment outcomes in the following survey year as a linear function of relational quality and estimate the reduced form model controlling for other observable establishment characteristics and stratum-year fixed effects. We then causally interpret the intertemporal association between relational quality and outcomes after showing the satisfaction of two identifying assumptions: covariate balance and outcome balance of relational quality[5]. The covariate balance addresses the concern that other contemporary char-

[3] By focusing on unionized establishments, to which these questions are asked, we mitigate the potential influence of strategic leverage, employed by firms to gain bargaining power against unions (Baldwin (1983), Perotti and Spier (1993)) and win wage negotiations (Myers and Saretto (2016), Michaels et al. (2019)), on the association between relational quality and future outcomes.

[4] We aggregate numerical responses to avoid the challenging task of defining relational quality and elements constituting it. We instead let the data speak. It turns out that the four cultural dimensions, both individually and collectively, drive our main results. While we use the first PC, alternative aggregation methods such as using the first common factor, average, and median yield similar results.

[5] As detailed in Section 3.2, where our strategy is compared to traditional methods such as instrumental variables (IV), difference-in-

acteristics may be correlated with relational quality within each stratum and year and influence future outcomes through relational quality (i.e., omitted variable bias). The outcome balance, or the absence of a contemporary association between relational quality and outcomes, ensures that the intertemporal association between relational quality and future outcomes does not merely reflect their contemporary association. It is worth noting that we opt not to include establishment fixed effects in this cross-sectional regression model because demeaning each characteristic would require information beyond each stratum-year pair, potentially compromising the model's key assumption of the *within-stratum-year* randomness in relational quality[6].

We validate our proxy for relational quality by showing its correlations with the occurrence of labor relations events that are likely to have stronger effects on employees' perceptions than management's. The proxy is positively correlated with the agreement between employees and management on wage issues, working conditions, and job security. It is also negatively correlated with disagreements on wage increase rates and actions against management, such as work-to-rule. We further show that these correlations are driven by employees' perceptions. Comparing employee-perceived relational quality and management-perceived relational quality, we find that the former exhibits more positive and significant correlations with agreements and more negative and significant correlations with disagreements and actions against management compared to the latter.

Using the proxy, we show that relational quality exhibits a positive and statistically significant association with future profitability, measured by return on assets and profit margin. This finding aligns with Edmans (2011), which shows that firms receiving higher employee ratings tend to have greater stock valuation. While the increased valuation can be attributed to either future cash flows or mispricing, our results support the former explanation[7]. In contrast, neither employee-perceived nor management-perceived relational quality demonstrates a significant association with future profitability. The insignificant association of management-perceived relational quality is consistent with Guiso et al. (2015), which shows that proclaimed values are not significantly linked to operating performance. Our results remain robust when considering alternative definitions of relational quality and profitability.

Next, we decompose relational quality into its culture, policy, and dispute dimensions[8] and show that the

differences (DiD), and regression discontinuity design (RDD), covariate balance parallels IV's exclusion restriction, while outcome balance aligns with DiD's parallel trends assumption and RDD's continuity of potential outcomes assumption.

[6] Including establishment fixed effects, however, leads to qualitatively similar results.

[7] Due to the anonymization of establishments in the WPS data, we are unable to merge it with other datasets and examine stock returns.

[8] To this end, we compute the first PCs of three distinct groups of score differences between employees and management, representing the cultural, policy, and dispute dimensions of relational quality. The cultural dimension is derived from four questions about information sharing, mutual trust, promise-keeping, and joint decision-making. The policy dimension is based on two questions regarding each party's policies toward the other. The dispute dimension is based on two questions concerning quarrels over trivial matters and hostility between employees and management.

cultural dimension accounts for the strong positive association between relational quality and future profitability. This finding echoes theoretical nuances revealed by a univariate analysis, where we compare the distributions of individual scores from employees and management. Specifically, the distributions for the dispute dimension are indistinguishable between employees and management. The distributions for the policy dimension differ only in terms of their means. However, for the cultural dimension, individual scores from employees exhibit not only smaller means but also greater variances compared to those from management. The second-moment pattern supports Gorton and Zentefis (2022), where employees interpret the CEO's desired culture with noise. The odd moment pattern is novel: on average, employees hold more negative perceptions on such dimensions as culture, for which management has stronger control[9].

Regarding channels, we find evidence supporting Edmans (2011), which argues that higher employee satisfaction can lead to improved productivity and retention, ultimately benefiting shareholders with greater long-term stock returns. We show that relational quality is positively associated with future labor productivity and negatively with future employee turnover, with the latter being due to an improvement in retention rather than recruiting. Employee-perceived relational quality exhibits a significant, positive association with productivity (but not with retention), while management-perceived relational quality is not significantly associated with productivity or retention. The cultural dimension of relational quality accounts for these associations. We measure labor productivity using total value-added per labor input, calculated as sales minus cost of goods sold minus sales, general, administrative expenses plus payroll, divided by payroll[10]. We measure employee turnover using the total number of employees who leave or join[11].

Our analysis of heterogeneous employee responses and the differential effects of relational quality provides further insights into underlying mechanisms. Firstly, our main findings regarding the effects of relational quality on profitability, productivity, and retention are driven by establishments with lower relational quality, where employees are likely more responsive to changes in relational quality. Secondly, the improvement in retention is driven by inexperienced employees as opposed to experienced ones[12]. This suggests that employees with fewer firm-specific skills and lower switching costs (Titman and Wessels (1988), Bae et al. (2011), Kim (2020)), or flexible workers (Berk

[9] For example, in the case of information sharing, an element of the cultural dimension, management chooses communication channels, and employees subsequently form their perceptions regarding the effectiveness of these channels for information sharing.

[10] We do not use the number of employees as a measure of labor input, as it fails to account for wages or the value of human capital, and the number of hours worked, as it is available only for the most recent three survey years in the WPS data.

[11] Our findings based on count variables such as employee turnover, retention, and recruitment remain qualitatively similar when we let these variables follow a Poisson distribution, following Cohn et al. (2022)'s recommendation in handling count data.

[12] Unfortunately, we are unable to examine differential effects on productivity among employee groups due to the absence of such information in the WPS data.

and Walden (2013)), are more sensitive to relational quality. Thirdly, supporting this possibility, our main findings are more pronounced in establishments that invest in the human capital development (HCD) of rank-and-file employees. In contrast, the investment in the HCD of middle managers and high-skill workers yields insignificant differences. We measure the HCD investment by whether job training is offered to each group of employees. Lastly, our main findings are stronger among private-firm establishments, which face financial constraints and challenges in attracting and retaining employees compared to public-firm establishments (Caggese et al. (2019), Michaels et al. (2019), Benmelech et al. (2021)). This finding suggests that employees in private firms value relational quality potentially as a substitute for initially lower wages (Howell and Brown (2023))[13].

Despite its positive impact on future outcomes, managers do not appear to recognize and leverage the value of relational quality. Firstly, if investors and managers appreciate relational quality (Stein (1988), Edmans (2009)), leading managers to perceive a decline in operating leverage, managers may consider increasing financial leverage (Simintzi et al. (2015)) and investment (Bai et al. (2020)). However, we find no significant association between relational quality and future debt-to-assets ratio or capital expenditure. Secondly, managers do not adjust compensation policies to better capitalize on relational quality. We find no significant association between relational quality and future wages or incentive schemes such as stock options. Furthermore, we do not find that the financing, investment, and compensation policies mediate the association between relational quality and future profitability, productivity, and retention. Overall, the evidence of managerial inaction mitigates concerns about reverse causation and corroborates that our proxy for relational quality captures the deviation of employees' perception from management's that is unrecognized by management. It also allows us to interpret our main findings as an *abnormal* increase in profitability, productivity, and retention that is unintended by managers[14].

Lastly, we elicit the implications for ESG rating divergence. We find that management-perceived relational quality shows a positive and significant correlation with social scores from MSCI ESG KLD - particularly, an employee subcomponent reflecting labor relations - as well as with our internally generated social scores. In contrast, neither relational quality nor employee-perceived relational quality exhibit such correlations. In constructing our do-it-yourself (DIY) social scores, we incorporate attributes that are used by rating agencies such as MSCI ESG KLD, S&P Global Ratings, and Bloomberg and available from the WPS data. Since these attributes primarily reflect management's perspective, the strong positive correlation observed only with management-perceived rela-

[13] This finding may also apply to family firms, which are predominantly privately held, as confirmed in the WPS data. They offer lower wages in exchange for greater job stability and are more inclined to honor implicit commitments for reputational reasons compared to nonfamily firms (Sraer and Thesmar (2007), Bassanini et al. (2013), Kim et al. (2018), Pagano et al. (2020), Gómez-Mejía et al. (2007)).

[14] However, the implication for managers is to enhance employee-perceived relational quality, an objective that is contractable between managers and shareholders, rather than relational quality that is an intangible and unobserved by managers and thus shareholders.

tional quality is not a coincidence. With this correlation in mind, we reinterpret the lack of significant associations between management-perceived relational quality and future outcomes. This implies that social scores produced by rating agencies, which rely on one-sided evaluations, likely exhibit insignificant associations with future business outcomes, offering limited value for firms and investors seeking to capitalize on these scores.

This paper makes several contributions to the literature on the relationship between intangibles and firm value. Firstly, it represents the first endeavor, to our knowledge, to measure and examine labor-management relational quality as an intangible that may enhance firm value[15]. Previous research has examined intangibles such as employee satisfaction (Edmans (2011)), culture (Gorton et al. (2022), Li et al. (2021)), trust (Lins et al. (2017)), and corporate social responsibility (Servaes and Tamayo (2013)). Secondly, this is among the first papers that provide causal evidence on the impact of intangibles on firm value. Lins et al. (2020) examine the market reactions following the Harvey Weinstein scandal and the #MeToo movement, highlighting the importance of having a non-sexist culture. Sandvik et al. (2020) conduct a field experiment showing that improving knowledge flows between coworkers enhances productivity. Thirdly, this paper provides evidence supporting productivity and retention as the channels through which employee satisfaction influences long-run stock returns, as suspected by Edmans (2011).

This paper also contributes to the literature on theorizing and measuring corporate culture. The definition of relational quality used in this study, which involves both employees and management, is consistent with existing theories. Culture has been modeled as shared knowledge (Crémer (1993)), shared beliefs (Van den Steen (2010)), or weights assigned to co-determined elements between employees and management (Gorton and Zentefis (2022)). The proxy for relational quality improves upon existing measures by incorporating responses from both employees and management to common questions. Existing measures, in the absence of data enabling bilateral assessment, have relied on questions directed to either party or different questions asked to both parties. Studies employing the former type of measures include Edmans (2011), which utilizes employees' evaluation from the Fortune magazine's "100 Best Places to Work for in America" (BPTW) list to assess employee satisfaction, and Graham et al. (2022), which surveyed top executives to elicit their views on culture. The latter type of measures has been employed by Guiso et al. (2015), which matches the BPTW firms to their cultural values advertised online.

Finally, this paper relates to the literature on the divergence of ESG ratings. As the sources of disagreement among rating agencies, Berg et al. (2022) identify measurement (56%), scope (38%), and weight (6%). They argue that these divergences arise because rating agencies use different indicators to measure the same attribute, utilize different attributes, and assign different weights to these attributes. This paper shows that even when rating agencies

[15] Bae et al. (2011) explores the relationship between employee relations, measured using KLD data, and capital structure.

use the same indicator (e.g., information sharing) to measure the same attribute (e.g., labor relations), the *measurement* divergence can arise for bilateral attributes (e.g., labor relations) due to differing perceptions among the parties involved (e.g., employees and management). Understanding the causes of the divergence is important because ESG ratings guide stakeholders, including investors. Asset prices not only reflect investors' ESG preferences (Pástor et al. (2021)) but also the divergence of ESG ratings (Avramov et al. (2022)).

2 Data

2.1 Workplace Panel Survey

Our data is from the KLI's WPS[16]. Since 2005, the KLI has conducted these biennial surveys on a stratified sample of establishments that employ 30 or more regular employees. The sample period is from 2005 to 2019, with 2019 being the latest survey year at the time of this writing. In 2015, the KLI nearly doubled the sample size to enhance representativeness. The KLI constructs strata that differ by industry, region, and size for the period from 2005 to 2013 and industry and size for the period from 2015 to 2019. Internet Appendix Table IA1 provides a list of 12 industry groups used to define strata for 2005-2013 and that of ten industry groups used to define strata for 2015-2019. The regional groups consist of Seoul, Gyeonggi/Incheon, Gangwon/Chungcheong, Jeolla/Jeju, and Gyeongsang, covering nine provinces and eight special cities in Korea. The size groups include establishments hiring 30-99, 100-299, 300-999, or 1000 or more regular employees for 2005-2013, and 30-99, 100-299, 300-499, or 500 or more regular employees for 2015-2019.

The KLI collects survey responses to code a wide range of variables pertaining to labor relations, unions, compensation, job training, human capital inflow and outflow, and the financial status and performance of establishments. Because it surveys a small number of randomly sampled establishments (1,905 in the initial sampling year of 2005) via their representatives, the KLI can ask hundreds of questions. However, because establishments are anonymized to ensure confidentiality, it is not feasible to merge the WPS data with other establishment or firm-level data and examine firm value measured by Tobin's Q or long-run stock returns, for example. Also, the absence of information on cash holdings restricts the investigation of liquidity-related research questions (Matsa (2010)), which are increasingly important in labor finance (Nishesh et al. (2022)) and corporate finance more broadly (Denis and Wang (2023)). Despite these limitations, the WPS data offer unique advantages. First, they allow researchers to explore previously unobservable aspects, such as relational quality (as explored in this paper) and the innovation

[16] The longitudinal data can be downloaded from the KLI's website (`https://www.kli.re.kr/wps`).

incentives of indirectly employed skilled workers (Hwang (2024)). Second, the dataset includes private-held companies, whose representation is growing in the U.S. (Doidge et al. (2017) but which remains underrepresented in research due to limited data access. At these private firms, employee may be more sensitive to relational quality, as shown in Section 5.7. For a more detailed description of the WPS data, refer to Internet Appendix Section A.

2.2 Survey responses

The key variables in this paper are the responses to each of the eight common questions posed to employees and management about their relationship. Table 1 presents these eight questions along with the corresponding three to five response choices available to the respondents. These questions represent three aspects of labor-management relational quality: culture, policy, and dispute. To ensure consistency in interpretation, the raw scores for the dispute aspect are inverted in all analyses, ensuring that higher values indicate more positive assessments across all three dimensions. The culture-related questions inquire about promise-keeping, mutual trust, information sharing, and joint decision-making on major changes in working conditions. The policy-related questions focus on the policies or attitudes of one party toward the other. The dispute-related questions gauge whether there are quarrels over trifles or hostility between employees and management. Union representatives and HR managers answer these questions on behalf of employees and management, respectively.

Figure 1 exhibits the normal density of the individual scores for employees (shown in black) and management (shown in gray) across two panels. Panel A displays the four culture scores, while Panel B presents the two policy and two dispute scores.

Panel A reveals two observations. Firstly, employees express less certainty than management about the cultural dimension of relational quality[17]. Across all four subpanels, employee scores exhibit higher variance and lower kurtosis compared to management scores. These even moment patterns support Gorton and Zentefis (2022), which conceptualizes culture as being jointly and sequentially determined by management and employees. For example, the CEO chooses communication channels with a certain culture in mind, and employees infer the intended culture with some level of noise. Secondly, employees, on average, hold more negative perceptions than management about the cultural dimension of relational quality. Across all four subpanels, employee scores exhibit a lower mean and less negative skewness compared to management scores. These odd moment patterns are novel and suggest that employees tend to understate relational quality relative to management in their survey responses for dimensions

[17] The higher variance in employee scores may be attributed to the more frequent turnover of the respondents representing employees. However, the average tenures of union representatives and HR managers in the WPS data are 3.19 and 3.20 years, respectively.

such as culture where management has stronger control and influence.

Panel B shows that employees perceive the policy dimension of relational quality more negatively than management. In the upper subpanels, employee scores exhibit a lower mean, possibly due to the hierarchical relationship between employees and management. However, variances show little difference, likely because each party independently formulates its own policies and simultaneously infers the policies of the other party. The panel also indicates that employees and management do not hold divergent perceptions regarding the dispute dimension of relational quality. In the lower subpanels, the normal density curves for employee scores are indistinguishable from those of management scores. This implies that, despite expressing more negativity regarding policies or expected disputes, employees do not hold significantly more negative perceptions about *realized* disputes, which offer limited room for inference.

2.3 Measuring labor-management relational quality

Using survey responses as ingredients, we construct a proxy for relational quality as follows. First, we compute the score distance between employees and management for each of the eight survey questions. These scores are the numerical answers provided on a three-, four-, or five-point scale. Second, to aggregate the information contained in these scores without relying on subjective judgments about their relative importance, we compute the PCs of the score distances[18]. Third, we select the first PC, which has an eigenvalue of 3.30 and hence captures substantial variation in score differences, as our proxy for relational quality perceived by employees relative to management. Additionally, we compute the first PC of employee scores and management scores separately to measure employee-perceived and management-perceived relational quality, respectively. They have respective eigenvalues of 4.16 and 3.97. We use them to examine whose perception accounts for the observed variation in relational quality and its association with future outcomes between employees and management. Table 2, Panel A reports the pairwise correlations of 61.27% between relational quality and employee-perceived relational quality, -39.15% between relational quality and management-perceived relational quality, and 48.47% between employee-perceived relational quality and management-perceived relational quality. Internet Appendix Table IA2 presents summary statistics.

Constructing the proxy in this manner offers several advantages. Firstly, by taking the distance of employee scores from management scores, we capture the reality where managerial perception reflects institutional quality and sets a basis for employee perception. Secondly, by utilizing *common* questions asked to employees and man-

[18] In computing the PCs, we account for the selection probability of each observation by using probability weights provided by the KLI. Furthermore, we confirm that the covariances between the eight individual scores remain reasonably constant over time, mitigating concerns regarding the independence of observations in panel data and the suitability of their use for PC computation.

agement, we avoid any distortions that may arise from differences in raters (Berg et al. (2022)) or target audiences (Grennan (2022)). In our setting, the KLI is a common rater and audience. Thirdly, our proxy is designed to reduce omitted variable bias. By computing score differences, we account for unobservable factors that may simultaneously influence the perception of employees and management at the economy-wide level (e.g., changes in laws and regulations), industry level (e.g., demand fluctuations, supply chain disruptions, and technological advancements), or regional level (e.g., natural disasters and economic distress).

2.4 Sample selection

The WPS data comprises a total of 18,016 observations obtained from 4,985 establishments surveyed between 2005 and 2019. Our final sample is derived from this data and includes observations from unionized establishments (4,467 observations from 1,208 establishments) that have complete financial statement information (reducing the sample to 1,745 observations from 542 establishments) and non-missing values for all control variables (further reducing the sample to 1,673 observations from 530 unique establishments)[19]. We require a union because only unionized establishments are asked the questions compiled in Table 1, which are common to both employees and management. For establishments without a union but with a labor-management council, different sets of questions are posed to employees and management. In addition, we require the availability of financial statement information because it is used to calculate key outcome variables such as profitability and labor productivity. The financial statement information collected at the firm level by the KLI is transformed into establishment-level data, considering factors such as each establishment's contribution to the firm's sales. Internet Appendix Section A provides further details on the conversion procedure.

3 Research Design

An econometrician interested in studying the causal effects of relational quality on establishment outcomes may initially consider field experiments or quasi-natural experiments. In a field experiment, random assignment of varying levels of relational quality would allow researchers to observe the effects on outcomes in a controlled setting. In a quasi-natural experiment, external forces or events beyond the control of establishments would be necessary to expose establishments to different levels of relational quality. However, the intangible and perception-based nature of relational quality presents challenges for randomizing its allocation or identifying exogenous shocks that create

[19] Internet Appendix Table IA3, Panel A shows the robustness of our main findings when excluding controls and utilizing the sample with 1,745 establishment-year observations.

variation in relational quality.

3.1 Stratum-year fixed effects model

Given the limitations of existing experimental approaches in our context, we propose a novel identification strategy that capitalizes on the KLI's random selection of establishments within each stratum and year. Specifically, we model establishment outcomes in the subsequent survey year as a linear function of relational quality. We then estimate the reduced-form model while controlling for other observable establishment characteristics and stratum-year fixed effects, as shown below:

$$y_{i,t+2} = \alpha + \beta r_{i,t} + \gamma' X_{i,t} + \mu_{s(i),t} + \epsilon_{i,t} \tag{1}$$

In Equation 1, i denotes the establishment, $s(i)$ the stratum to which establishment i belongs, and t the calendar year. $y_{i,t+2}$ represents an outcome of establishment i in year t+2, such as profitability, labor productivity, or employee turnover. $r_{i,t}$ denotes the relational quality of establishment i in year t. The vector $X_{i,t}$ encompasses time-varying establishment characteristics, including size, age, employment, financial leverage, capital intensity, intangible assets, and per-employee wage. These observable characteristics ($X_{i,t}$) are included as controls to mitigate potential omitted variable bias. To address concerns about *reverse causality*, we focus on the relationship between relational quality and future outcomes. In estimating the coefficient of interest, β, we adjust for the sampling probability of each observation using the probability weights provided by the KLI. We use heteroskedasticity-robust (White) standard errors throughout the analysis.

The term $\mu_{s(i),t}$ represents the stratum-year fixed effects. Including $\mu_{s(i),t}$ allows us to estimate the causal effects of $r_{i,t}$ on $y_{i,t+2}$ by utilizing the within-stratum-year variation in $r_{i,t}$, which is random under the assumptions described and tested below. This approach also helps mitigate potential concerns about *selection bias* by controlling for characteristics that the KLI uses to define strata - such as industry, region, and size - that may vary over time. For example, union characteristics like aggressiveness could vary widely across industries.

3.2 Identifying assumptions

It is important to recognize that the inclusion of $\mu_{s(i),t}$ in Equation 1 randomizes not only the allocation of relational quality (r_t) but also all other establishment characteristics (y_t, X_t, and ϵ_t) within each stratum and year[20].

[20] We assume random allocation within not just each stratum but each stratum and year as the KLI newly samples about 13% of establishments each survey year to replace dropouts while preserving within-stratum randomness across establishments, as further discussed in

Therefore, for any pair of establishments $\hat{i} \neq \tilde{i} \in s(i)$,

$$(y_{\hat{i},t}, r_{\hat{i},t}, X'_{\hat{i},t}, \epsilon_{\hat{i},t})' \perp (y_{\tilde{i},t}, r_{\tilde{i},t}, X'_{\tilde{i},t}, \epsilon_{\tilde{i},t})'. \tag{2}$$

In other words, concerns about *omitted variable bias* remain both contemporaneously between establishments and over time across survey years, as illustrated in Figure 2, Panel A. Specifically, other contemporary (X_t and ϵ_t) or future (X_{t+2} and ϵ_{t+2}) characteristics may be correlated with contemporaneous (r_t) or future (r_{t+2}) relational quality and in turn affect establishment outcomes (y_{t+2}) in the subsequent survey year. Also, any observed association between relational quality and future establishment outcomes, captured by β, could simply reflect their contemporary association (particularly if the relational quality is persistent, a possibility we explore below). In such a case, reverse causality becomes a plausible concern even when modeling the outcome as a function of the previous survey year's relational quality. To address these concerns, we check covariate balance (i.e., $r_t \perp X_t$ and $r_t \perp X_{t+2}$) as well as outcome balance (i.e., $r_t \perp y_t$) of relational quality[21]. Further assuming that if many observable characteristics (X_t) are uncorrelated with relational quality, so are unobservables (ϵ_t), we argue that for $\hat{i} \neq \tilde{i} \in s(i)$, $\mu_{s(i),t}$ implies

$$r_{\hat{i},t} \perp r_{\tilde{i},t}. \tag{3}$$

To assess the balance of covariates and outcomes, for each establishment characteristic we calculate the difference in its means between establishments with high and low relational quality and examine the statistical significance of the difference. We categorize establishments as high or low based on the sample median of relational quality within each stratum and year. Figure 2 provides conceptual diagrams illustrating how covariate balance (Panel B) and outcome balance (Panel C) effectively isolate the relationship between r_t and Y_{t+2} and enable a causal interpretation of β. Figure 3, discussed in Section 6.1, visualizes the outcome balance (i.e., insignificant associations between r_t and Y_t) and treatment effects (i.e., significant associations between r_t and Y_{t+2}), the latter of which switch on (or off) when stratum-year fixed effects are included (or excluded).

Note that our proposed identification strategy has a conceptual analogy with traditional methods such as IV, DiD, and RDD. Firstly, random sampling introduces exogenous variation in relational quality within stratum and year, similar to how an IV provides exogenous variation to an endogenous variable. This is also akin to the setup in

Section 6.2. With the assumption of dynamic randomness, we estimate intertemporal associations across two survey years, only partially leveraging the panel structure of the WPS data.

[21]Note that it is not feasible to implement matching algorithms and construct a sample of establishments that only differ by relational quality because each observation represents a varying number of establishments in our survey-based data.

DiD, where a shock affects a treated group differently from a control group, and in RDD, where a cutoff point creates distinct treatment effects for units just above and below the threshold. Secondly, the covariate balance ensures comparability across different levels of relational quality. While it serves a similar role as in traditional methods - supporting IV's exclusion restriction, DiD's parallel trends assumption, and RDD's local randomization - it is relatively more critical in our context. Unlike traditional methods, where a specific characteristic is randomized, our strategy relies on the random selection of establishments, not their individual traits. Lastly, outcome balance aligns closely with the parallel trend assumption in DiD and the continuity of potential outcomes assumption in RDD. It ensures that, in the absence of random variation in relational quality, establishments with high and low relational quality would exhibit no significant differences in outcome variables, thereby reinforcing the validity of the causal interpretation.

3.3 Non-persistence

To further mitigate the potential concern that relational quality reflects an sticky establishment trait with limited temporal variation (e.g., management-perceived relational quality) rather than a temporary perceptual deviation, we examine the non-persistence of relational quality as defined in Definition 1. We categorize establishments into N bins[22] based on quantiles of relational quality, calculate the probabilities of establishments switching from one bin to another, and consider relational quality as non-persistent if the probability of remaining in the same bin in year t+2 as in year t is not greater than the probabilities of switching for each bin.

Definition 1 (Persistence)**.** *$r_{i,t}$ is persistent if* $\max_{n=1,\cdots,N} P_{m,n} = P_{m,m}, \forall m = 1, \cdots, N$*, where N is the number of bins across which r_i may switch over time,* $P_{m,n} = Prob(r_{i,t+2} \in G_n | r_{i,t} \in G_m)$*,* $G_m = \{r_{i,t} | q((m-1)/N) \leq r_{i,t} \leq q(m/N)\}$*, and $q(k)$ is a $(k \times 100)^{th}$ percentile of $r_{i,t}$ in year t.*

4 Results on validity

4.1 Correlations with labor relations events

Table 2 provides evidence supporting the validity of our proxy for relational quality, as demonstrated by its correlations with observed labor relations outcomes. The table includes correlation coefficients for *relational quality*

[22] We choose N = 4 as the minimum number of establishments required to compute transition probabilities for a stratum, considering that the average number of establishments per stratum is approximately seven. Setting N below the average helps mitigate potential selection bias. Additionally, to ensure the robustness of our results, we perform sensitivity analyses using values close to our chosen N.

in column (1), *employee-perceived relational quality* in column (2), and *management-perceived relational quality* in column (3).

Panel B examines the correlations between *relational quality* and the occurrence of agreements on wage issues, changes in working conditions, and job security. Column (1) shows a positive correlation between *relational quality* and agreements, which is statistically significant at the 1% level. These correlations suggest that our survey-based proxy effectively captures the perception of relational quality that is more positive among employees compared to management following events that favor employees. Columns (2) and (3) show that correlations observed in column (1) are driven by employees' perceptions. Specifically, *employee-perceived relational quality* exhibits positive and significant correlations with agreements at the 1% or 5% levels, whereas *management-perceived relational quality* displays negative correlations that are not always significant. These correlations potentially reflect the disutility of managers from yielding to employees.

Panel C explores the correlations between *relational quality* and disagreements regarding wage increase rates. The intensity of disagreement is measured in various ways, using the difference between employee-proposed and management-proposed rates, the difference between employee-proposed and set rates, the difference between set and management-proposed rates, and the number of meetings held to negotiate wage increase rates. Column (1) shows a negative correlation between *relational quality* and disagreements, which is statistically significant at the 1% or 5% levels in the first four rows. These correlations suggest that our survey-based proxy accurately captures the perception of relational quality that is more negative among employees compared to management following events that disfavor employees. Similar to Panel B, the correlations in column (1) are driven by employees' perceptions, as demonstrated in columns (2) and (3). Notably, the correlation in column (2) is more negative and statistically significant compared to column (3) across all four rows. Furthermore, the fifth row shows that per-employee wage does not exhibit significant correlations with *relational quality*, *employee-perceived relational quality*, and *management-perceived relational quality*. This finding supports the notion that employees' disutility stems from their disagreement with management regarding wage increase rates rather than the absolute wage level itself.

Panel D analyzes the correlations between *relational quality* and employee actions against management, such as work-to-rule and strikes. Column (1) shows a negative correlation between *relational quality* and work-to-rule, which is significant at the 1% level and is driven by employees' perceptions. The correlation in column (2) is more negative and statistically significant compared to column (3) in the first row. However, strikes exhibit an insignificant correlation with *relational quality*, although they display similarly negative correlations with *employee-perceived relational quality* and *management-perceived relational quality*. In the second row, these correlations are

significant at the 1% and 5% levels and have similar magnitudes (-0.1101 and -0.1182, respectively). Further, these correlations are notably larger than the correlations with the non-disruptive action of work-to-rule (-0.0833 and -0.0339, respectively) in the first row. These observations suggest that employees and management do not form divergent perceptions following a disruptive action such as strikes. They are also consistent with the insignificant difference in means observed for the dispute dimension of relational quality in the lower subpanels in Figure 1, Panel B.

Based on these correlations with labor relations events, we conclude that the proxy is valid. We proceed to investigate the causal relationship between the proxy for *relational quality* and outcomes, after examining covariate and outcome balances.

4.2 Covariate and outcome balances

Table 3 shows the balance of covariates and outcomes of *relational quality*. Columns (1) and (2) present the sample mean for each observable characteristic of high and low *relational quality* establishments, respectively. The establishments are categorized as high or low based on the median of *relational quality* within each stratum and year. The mean values are adjusted for the probability weights provided by the KLI, reflecting the sampling probability of each observation. Column (3) displays the difference in means between columns (1) and (2), accompanied by its standard error in column (4). Similarly, column (5) presents the within-stratum-year difference in means between columns (1) and (2), with its standard error in column (6). The figures differ between columns (3) and (5) because the latter are coefficients obtained from regressions of outcomes on *relational quality* and stratum-year fixed effects, which involve singletons. The table reveals that high and low *relational quality* establishments have similar observable characteristics, encompassing all outcome and control variables considered in this paper.

The only notable difference between high and low establishments is observed in labor productivity. The difference is significant at the 10% level in column (3) and the 5% level in column (5). It could be attributed to two possibilities. Firstly, when *relational quality* is high, employees may experience an immediate increase in productivity. Secondly, when productivity is high, employees may perceive *relational quality* as being higher than management does, especially if it is accompanied by increased profitability and compensation. However, the latter possibility is less likely, as both profitability, measured by return on assets and profit margin, and per-employee wages do not exhibit significant differences between high and low *relational quality* establishments.

4.3 Non-persistence

Table 4 shows the non-persistence of *relational quality*, as defined in Definition 1. To this end, we examine transition probabilities by creating bins based on quartiles of *relational quality*. We then allocate establishments into four *relational quality* bins and calculate the probability of transitioning from one bin to each of the four bins in the subsequent survey year. This analysis employs only the sample of establishments that constitute strata with at least four establishments and therefore can have the transition probabilities computed. Panel A reports the transition probabilities for *relational quality*, Panel B for *employee-perceived relational quality*, and Panel C for *management-perceived relational quality*. To highlight differences in magnitudes, we shade the figures in the range [0, 10), [10, 20), [20, 30), [30, 40), and [40, 50) with increasingly darker gray colors. The figures are presented in percentages. In unreported analysis, we find that using terciles or quintiles yields qualitatively similar results.

The table reveals that while *management-perceived relational quality* exhibits persistence, *relational quality* and *employee-perceived relational quality* do not. In Panels A and B, only establishments in bins 1 and 3 remain in the same bins in the subsequent survey year with the highest probabilities (42.8% and 30.7% in Panel A, and 45.6% and 29.1% in Panel B). In contrast, in Panel C, establishments in every bin have the highest probability of remaining in the same bin in the subsequent survey year. This pattern supports Gorton and Zentefis (2022), which argues that the CEO's desired culture (comparable to persistent *management-perceived relational quality*) and the noise associated with employees' interpretations (comparable to non-persistent *relational quality*) shape the observed culture (comparable to non-persistent *employee-perceived relational quality*). It is also consistent with the larger variance of employee scores compared to management scores for the cultural dimension of relational quality, as depicted in Figure 1, Panel A.

Another notable observation is the limited improvement of *employee-perceived relational quality* in low-rated establishments compared to high-rated establishments. In Panel B, establishments in bin 1 show declining probabilities (25.6%, 17.9%, and 11.0%) of transitioning to bins 2, 3, and 4. Conversely, establishments in bin 4 have similar probabilities (24.7%, 21.1%, and 24.2%) of moving to bins 3, 2, and 1. Consequently, the average *employee-perceived relational quality* is lower than the average *management-perceived relational quality*, for which the probabilities of improving from low-rated establishments and declining from high-rated establishments are symmetric. This pattern echoes the smaller mean of employee scores compared to management scores observed in Figure 1, Panel A.

5 Main results

5.1 Profitability

Table 5 explores the association between *relational quality* and future profitability, measured by return on assets in Panel A and profit margin in Panel B. We focus on future operating performance as a measure of establishment value rather than long-run stock returns for several reasons. Firstly, the KLI anonymizes establishments, preventing linkage with other datasets, including stock price data. Secondly, even if stock prices can be merged in, isolating an individual establishment's contribution to its parent firm's valuation would be challenging. Thirdly, unlike stock returns, profitability metrics are not subject to potential issues like mispricing (Edmans (2011)) or the differential impact of labor share on the cost of capital (Donangelo et al. (2019)). Still, our profitability results could potentially extended to yield valuation implications provided that *relational quality* does not simultaneously affect the parent firm's costs of capital.

Column (1) shows that establishments with higher *relational quality* have greater profitability in the subsequent survey year. The coefficient on *relational quality* is positive and statistically significant at the 5% level in Panel A and the 1% level in Panel B. A one-standard deviation higher *relational quality* is associated with a 15.1% higher return on assets (= 1.789 × 0.0053 / 0.063) and a 23.5% higher profit margin (= 1.789 × 0.0072 / 0.067), relative to their respective sample means. This finding suggests a causal link between *relational quality* and operating performance. However, Columns (2) and (3) indicate that neither *employee-perceived relational quality* nor *management-perceived relational quality* is significantly associated with future profitability. The coefficients are insignificant at conventional levels in both Panels A and B, although the coefficient for *employee-perceived relational quality* in column (2) is positive, consistent with Edmans (2011). These results suggest that bilateral intangible factors such as relational quality, when evaluated unilaterally, noisily predict outcomes that they are suspected to influence.

Columns (4) through (6) show that the cultural dimension of *relational quality* drives the results. We measure the dimension using the first PC of four culture-related score differences between employees and management, referred to as *relational quality: culture*. The coefficient on *relational quality: culture* is positive and significant at the 5% level in Panel A and the 1% level in Panel B. A one-standard deviation higher *relational quality: culture* is associated with a 18.8% higher return on assets (= 1.641 × 0.0072 / 0.063) and a 27.7% higher profit margin (= 1.789 × 0.0113 / 0.067), relative to their respective sample means. On the contrary, the coefficients on *relational quality: policy* and *relational quality: dispute*, similarly defined using two policy and two dispute-related scores,

are insignificant. In Internet Appendix Table IA4, Panel A, we replace *relational quality: culture* with individual culture-related score differences and show that they are all positively and significantly associated with future profitability. The dependent variables are the return on assets in columns (1) to (4) and the profit margin in columns (5) to (8). The four cultural elements are promise-keeping in columns (1) and (5), mutual trust in columns (2) and (6), information sharing in columns (3) and (7), and joint decision-making in columns (4) and (8). The coefficients are significant at the 10% level in column (1) and the 5% and 1% levels in columns (2) through (8).

The positive and significant association between all four score differences and future profitability is consistent with a halo effect (Thorndike (1920), Shrout and Fleiss (1979)). In our context, the halo effect implies that when a response is positive for one culture-related question, it is also likely positive for other culture-related questions. Berg et al. (2022) refers to this phenomenon as a rater effect, observed across ESG rating agencies. Guiso et al. (2015) models the halo effect as an error-in-variable problem, potentially introducing an attenuation bias that affects all questionnaire responses. We circumvent this problem by computing the first PC, a single number aggregating information contained in score differences, and using it as our proxy for relational quality.

The results remain robust when we use alternative definitions of profitability and relational quality. In Table 5, we define return on assets as earnings before interest and taxes (EBIT) divided by total assets, while we define profit margin as EBIT divided by sales. In unreported analysis, we find that results are similar when we use alternative numerators such as net income or earnings before interest, taxes, depreciation, and amortization to define return on assets and profit margin. Internet Appendix Table IA5, Panel A shows that results are similar when we compute the proxy for relational quality by computing the first PC of eight employee scores and eight management scores separately and then taking the difference between the two first PCs.

5.2 Labor productivity

Table 5, Panel C examines the association between *relational quality* and future labor productivity. We measure labor productivity by the ratio of EBIT plus payroll to payroll. We employ EBIT plus payroll as the output measure because relational quality can impact every employee, and it allows us to account for the different objectives of employees: maximizing sales or minimizing costs, excluding payroll[23]. To measure labor input, we use payroll for several reasons. Firstly, it is highly correlated with total hours worked, which is determined by multiplying the number of employees by the average hours worked. Secondly, using payroll as the input measure avoids the assumption that average hours worked are uniform across establishments. This assumption is implicit in studies that

[23] Excluding payroll has no impact on the estimation, as (EBIT+payroll)/payroll = EBIT/payroll+1

use the number of employees as a proxy for labor input. Lastly, using payroll ensures that labor input and output are measured in the same currency unit. Consequently, the distribution of labor productivity is closer to normal compared to using the number of employees or total hours worked.

Column (1) shows that establishments with higher *relational quality* exhibit greater labor productivity in the subsequent survey year. The coefficient on *relational quality* is positive and significant at the 1% level. A one-standard deviation increase in *relational quality* is associated with a 27.4% increase in labor productivity (= 1.789 × 0.0976 / 0.638). Column (2) shows that *employee-perceived relational quality* is also significantly and positively associated with future productivity, although the coefficient is slightly less significant at the 5% level. These results support Edmans (2011), which suspects productivity as a channel through which employee satisfaction influences long-run stock returns. In contrast, column (3) shows no significant association between *management-perceived relational quality* and future productivity. Columns (4) to (6) show that the cultural dimension of *relational quality* drives the observed results. The coefficient on *relational quality: culture* is positive and significant at the 1% level, with a one-standard deviation increase in *relational quality: culture* associated with a 29.1% increase in labor productivity (= 1.641 × 0.1132 / 0.638), whereas those on *relational quality: policy* and *relational quality: dispute* are insignificant. In Internet Appendix Table IA4, Panel B, columns (1) to (4), we consider differences in individual culture-related scores instead of *relational quality: culture* and find that they are positively associated with future productivity. The coefficients on promise-keeping, information sharing, and joint decision-making are significant at the 1% level, while the coefficient on mutual trust is insignificant.

In Internet Appendix Table IA5, Panel B, we explore alternative definitions of productivity. Column (1) shows that *relational quality* is positively associated with the ratio of sales (the target of employees in production and sales units) to payroll in the following survey year, although the coefficient is insignificant. Conversely, column (2) shows a negative, yet insignificant, association between *relational quality* and the ratio of cost of goods sold (the target of employees in cost control units) to payroll in the subsequent survey year. However, column (3) shows a significant positive association at the 5% level between *relational quality* and the ratio of gross profit to payroll in the following survey year. Lastly, column (4) shows a positive but insignificant association between *relational quality* and the ratio of sales, general, and administrative expenses to payroll in the subsequent survey year.

5.3 Employee turnover

Table 5, Panel D investigates the association between *relational quality* and future employee turnover, measured as the logarithm of one plus the number of outgoing and incoming employees. Column (1) presents weak evi-

dence that establishments with higher *relational quality* have lower turnover in the subsequent survey year. The coefficient on *relational quality* is negative and marginally significant at the 10% level, with a one-standard deviation increase in *relational quality* associated with a 11.0% decrease in employee turnover (= exp(1.789 × -0.065) - 1). However, columns (2) and (3) show that neither *employee-perceived relational quality* nor *management-perceived relational quality* exhibit significant associations with future turnover. These results mildly support Edmans (2011), which suspects a decline in employee turnover as one of the channels through which employee satisfaction affects long-run stock returns.

Columns (4) to (6) show that the observed results are driven by the cultural dimension of *relational quality*. The coefficient on *relational quality: culture* is positive and marginally significant at the 10% level, with a one-standard deviation increase in *relational quality: culture* associated with a 10.9% decrease in employee turnover (= exp(1.641 × -0.0706) - 1), whereas those on *relational quality: policy* and *relational quality: dispute* are insignificant. In Internet Appendix Table IA4, Panel B, columns (5) to (8), we consider differences in individual culture-related scores instead of *relational quality: culture* and find that they are negatively associated with future turnover. However, the statistical significance varies: promise-keeping is insignificant in column (5), mutual trust is significant at the 5% level in column (6), information sharing is insignificant in column (7), and joint decision-making is significant at the 1% level in column (8).

5.4 Heterogeneous employee responses

Table 6 examines the differential responses of employee groups to *relational quality* in terms of retention and hiring, as co-determinants of employee turnover. We only consider employee turnover because the data does not allow us to observe productivity differences among employee groups. We use the logarithm of one plus the number of outgoing employees as an inverse measure of retention and the logarithm of one plus the number of incoming employees as a measure of hiring. We take advantage of the richer information available about incoming employees, such as their contract type (regular versus temporary) and level of experience (with versus without relevant experience). Internet Appendix Table IA5, Panel C explores alternative definitions of retention and hiring, such as percentages of outgoing and incoming employees, and demonstrates qualitatively similar results.

The table shows that the decrease in employee turnover observed in Table 5, Panel D is primarily due to improved retention rather than increased recruitment. This further supports the notion that *relational quality* captures the relative perception of *existing* employees, which may not be effectively and credibly communicated to job seekers outside the organization. Column (1) reveals that establishments with higher *relational quality* have fewer

outgoing employees in the subsequent survey year. The coefficient on *relational quality* is negative and significant at the 5% level[24]. Column (2) shows that establishments with higher *relational quality* also tend to have a smaller number of incoming employees in the subsequent survey year, although the coefficient is marginally significant at the 10% level. The observed decrease in hiring in column (2) reflects the combined effect of the increased retention in column (1) (i.e., reduced need for replacements) and increased recruitment for purposes other than replacement, which might be challenging when *relational quality* is low.

To assess the relative importance of these two factors, we compare the magnitude of the coefficients: -0.0676 in column (1) and -0.0646 in column (2). These coefficients indicate that a one standard deviation (SD) increase in *relational quality* is associated with a 12.09% decrease in the number of outgoing employees (a decline of 1.33) and an 11.56% decrease in the number of incoming employees (a decline of 1.10) in the subsequent survey year[25]. In other words, when *relational quality* is one SD higher, on average, there are 1.33 fewer employees leaving, and 0.23 more employees joining to fill vacancies (1.33 - 1.10 = 0.23). The primary reason for the decrease in hiring appears to be a decline in the need for replacements. Therefore, we interpret a decline in the number of incoming employees as a decline in the number of outgoing employees, assuming that the labor demand for establishments remains reasonably stable over a two survey-year period.

Columns (3) and (4) compare regular and temporary employees among new hires and show that regular employees are less likely to leave (and therefore join), whereas temporary employees are not. Specifically, establishments with higher *relational quality* have fewer incoming regular employees in the subsequent survey year, while they do not have fewer incoming temporary employees. The coefficient is significant at the 5% level in column (3) and insignificant in column (4). Temporary employees, such as fixed-term workers and part-timers, appear to be insensitive to relational quality, possibly because they are typically hired based on demand, work for less than a survey year, and are not represented by the union, whose representative answers the survey questionnaire.

Columns (5) and (6) compare incoming regular employees with and without relevant work experiences and show that inexperienced employees are less likely to leave (and therefore join), while experienced employees are not. Specifically, establishments with higher *relational quality* have fewer incoming inexperienced employees in the subsequent survey year, whereas they do not have fewer incoming experienced employees. The coefficient is significant at the 1% level in column (5) and insignificant in column (6). These results suggest that employees with fewer firm-specific skills find it less costly to leave and are therefore more sensitive to *relational quality* when deciding whether

[24] In unreported analysis, we find that the decrease in the number of outgoing employees is driven by voluntary leavers, suggesting an increase in the number of voluntary stayers.

[25] -0.0676 x 1.789 = 12.09%. exp(2.482) - 1 = 1.33. -0.0646 x 1.789 = 11.56%. exp(2.356) - 1 = 1.10.

to stay or leave.

5.5 Heterogeneous effects on establishments with varying relational quality

Table 7 shows that the results in Tables 5 and 6 are driven by establishments with lower relational quality, implying potentially stronger responses from employees in low-relational quality environments. To this end, we re-estimate column (1) of Tables 5 and 6 using two distinct subsamples. These subsamples in Table 7 include establishments with average stratum-year relational quality below (resp. above) its median in odd-numbered (resp. even-numbered) columns. The analysis considers five outcomes: return on assets, profit margin, labor productivity, employee turnover, and the number of outgoing employees in columns (1)-(10).

Columns (1) to (8) show that the results in Table 5 are driven by establishments with lower average stratum-year relational quality. The coefficient on relational quality is significant only in odd-numbered columns. An exception is employee turnover in column (7), which is jointly determined by retention and hiring. Since retention dominates hiring as a determinant, as shown in Table 6, we examine retention alone. Columns (9) and (10) show that results in Table 6 are driven by establishments with lower average stratum-year relational quality. The coefficient is significant at the 10% level in column (9) and insignificant in column (10). Because the variation of relational quality is more tightly bounded from below (resp. above) for establishments with lower (resp. higher) average stratum-year relational quality, we also interpret the results to imply that future outcomes improve with an increase in relational quality rather than deteriorate due to a decline in relational quality.

5.6 Heterogeneous effects based on varying human capital importance

Table 8 examines the differential effects of *relational quality* based on the importance of different employee groups. To assess the reliance of establishments on each employee group, we utilize their investment in HCD for rank-and-file employees (i.e., field employees), middle managers (i.e., field supervisors), and high-skill workers (i.e., R&D experts). We create an indicator that takes the value of one if job training is offered to each employee group in the previous survey year and zero otherwise. We then augment Equation 1 by including this indicator and its interaction with *relational quality* on the right-hand side. The analysis considers four outcomes: return on assets (Panel A, columns (1)-(4)), profit margin (Panel A, columns (5)-(8)), labor productivity (Panel B, columns (1)-(4)), and employee turnover (Panel B, columns (5)-(8)).

Columns (1) and (5) show that our main results regarding the effects of *relational quality* on profitability, productivity, and retention are driven by establishments that invest in the HCD of rank-and-file employees. The coef-

ficients on the interaction term are significant at 5%, 1%, and 10% levels, while the coefficients on *relational quality* are insignificant for return on assets, profit margin, and productivity. For employee turnover, both the interaction term and *relational quality* have insignificant coefficients. In contrast, columns (2), (3), (6), and (7) reveal that investment in the HCD of middle managers and high-skill employees does not account for our main results, as the coefficients on the interaction term are insignificant. These findings align with the observation in Table 6, indicating that inexperienced employees are most influenced by *relational quality* in their decisions to stay or leave.

However, columns (4) and (8) demonstrate that it is not labor intensity that explains our main results. We measure labor intensity as the inverse of the ratio of property, plant, and equipment (PP&E) to total assets. We augment Equation 1 by including labor intensity and its interaction with *relational quality* on the right-hand side. The coefficients on the interaction term are insignificant. In unreported analysis, we explore alternative measures of labor intensity, such as the ratio of payroll to PP&E and the ratio of intangible assets to total assets, and find qualitatively similar results. This finding corroborates that our main results are driven by a specific group of employees with fewer firm-specific skills and lower switching costs, such as rank-and-file employees.

5.7 Heterogeneous effects on private versus public establishments

Table 9 presents the differential effects of *relational quality* on private and public establishments. The results indicate that the impact is more pronounced on private establishments, which often face financial constraints and challenges in attracting and retaining employees compared to public establishments. To show this, we create an indicator that takes the value of one for establishments belonging to publicly-traded firms[26] and zero for establishments belonging to privately held firms. We then augment Equation 1 by including the indicator and its interaction with *relational quality* on the right-hand side. The analysis considers four outcomes: return on assets in column (1), profit margin in column (2), labor productivity in column (3), and employee turnover in column (4). Since information on the listing status of firms to which establishments belong is available starting 2015 in the WPS data, the analysis is limited the sample period from 2015 to 2019.

The table reveals that our main results are more pronounced among private establishments compared to public establishments. The coefficients on *relational quality*, which capture the relationship between *relational quality* and future outcomes for private establishments, are positive for return on assets, profit margin, and labor productivity, and negative for employee turnover. Despite the small sample size, these coefficients are significant at the 1%,

[26] Specifically, firms whose stocks are traded on the Korea Exchange through Korea Composite Stock Price Index (KOSPI), Korea Securities Dealers Automated Quotations (KOSDAQ), or Korea New Exchange (KONEX).

1%, 5%, and 10% levels, respectively. Moreover, the magnitudes of these coefficients are larger than those obtained from our baseline regressions. In columns (1) to (4), the coefficients are 0.0121, 0.0145, 0.1247, and -0.1183, respectively. These values correspond to 228.3%, 164.8%, 127.8%, 182.0% of the magnitude of the coefficients on *relational quality* in column (1) of Table 5.

It is worth noting that *relational quality* also makes positive effects on public establishments, albeit to a lesser extent. The coefficients on *relational quality* and the interaction term, which sum to capture the relationship between *relational quality* and future outcomes for public establishments, are positive for return on assets, profit margin, and labor productivity, and negative for employee turnover. These coefficients are 0.0021, 0.0078, 0.1091, and -0.171, or 39.6%, 88.6%, 111.8%, 263.1% of the magnitude of the coefficients on *relational quality* in column (1) of Table 5. In an unreported analysis, we test the joint significance of these two coefficients using the inverse of the public establishment indicator. The coefficients on the indicator are insignificant in columns (1) and (2) and significant at the 5% level in columns (3) and (4). For public establishments, *relational quality*, although significantly positively affecting productivity and retention, appears to have an insignificantly positive impact on profitability.

5.8 Managerial perception and corporate policies

Table 10 examines the possibilities that managers recognize the value of relational quality and adjust corporate policies accordingly. Firstly, if high *relational quality* leads managers to perceive a decline in operating leverage, managers may respond by increasing financial leverage (Simintzi et al. (2015)) and investment (Bai et al. (2020)). Secondly, managers may modify compensation policies to better capitalize on *relational quality*. However, the results in the table provide evidence against these adjustments. This managerial inaction also helps mitigate concerns regarding reverse causality in our main findings in Table 5, which could arise if managers actively sought to enhance employees' perceptions (i.e., employee-perceived relational quality) relative to their own (i.e., management-perceived relational quality) to boost productivity, retention, and profitability.

Panel A shows that establishments with higher *relational quality* do not exhibit higher financial leverage in the subsequent survey year, as measured by the debt-to-asset ratio. The coefficient on *relational quality* is insignificant in column (1). Further, financial leverage does not mediate the relationship between *relational quality* and the four outcomes (return on assets, profit margin, labor productivity, and employee turnover) in the subsequent survey year. To examine this, we regress these future outcomes on *relational quality*, financial leverage, and their interaction in columns (2) to (5), respectively. The coefficients on the interaction term are mostly insignificant, except for column (4), where the coefficient is marginally significant at the 10% level with the opposite sign. These results

remain robust when considering alternative measures for financial leverage, such as the debt-to-equity ratio.

Panel B shows that establishments with higher *relational quality* do not exhibit increased capital expenditure in the subsequent survey year, as measured by the ratio of the change in PP&E between the current and previous calendar years to total assets[27]. The coefficient on *relational quality* is insignificant in column (1). Moreover, capital expenditure does not mediate the relationship between *relational quality* and the four outcomes in the subsequent survey year. To explore this, we regress these future outcomes on *relational quality*, capital expenditure, and their interaction in columns (2) to (5), respectively. The coefficients on the interaction term are insignificant.

Panel C shows that establishments with higher *relational quality* do not pay employees more in the subsequent survey year. The coefficient on *relational quality* is insignificant in column (1). Further, per-employee wages do not mediate the relationship between *relational quality* and the four outcomes in the subsequent survey year. To explore this, we regress these future outcomes on *relational quality*, per-employee wages, and their interaction in columns (2) to (5), respectively. The coefficients on the interaction term are insignificant. Internet Appendix Table IA6 examines alternative incentive schemes in place of wages and yields similar results. Panel A considers merit pay, Panel B stock options, and Panel C employee stock ownership plans (ESOP). Merit pay allows employees to negotiate the next year's salary based on their performance this year. Establishments with high *relational quality* are not more likely to introduce these incentive schemes in the subsequent survey year. The coefficient on *relational quality* is insignificant in column (1). Additionally, these schemes do not mediate the association between *relational quality* and the four outcomes in the subsequent survey year. To investigate this, we regress these future outcomes on *relational quality*, an indicator for each incentive scheme, and their interaction in columns (2) to (5), respectively. The coefficients on the interaction term are mostly insignificant, except in Panel A, column (1), which reports a positive association between *relational quality* and merit pay that is significant at the 10% level.

5.9 ESG scores and establishment outcomes

We explore the implications of ESG rating agencies evaluating bilateral factors, such as labor relations, based solely on management-provided information. To investigate this, we adopt two complementary approaches. First, we construct three DIY social scores that approximate those of MSCI ESG KLD, S&P Global Ratings, and Bloomberg[28].

[27] We use the change in PP&E instead of PP&E purchases alone due to the unavailability of separate data on PP&E purchases and sales in the WPS data. In an unreported analysis, we also investigate the impact on R&D and find similarly insignificant results.

[28] We only consider the attributes available in the WPS that are included in these agencies' ratings. Our mapping may be imprecise, as specific methodologies used by these agencies (e.g., weighting scheme) are not disclosed. Internet Appendix Table IA7 lists these attributes, their inclusion in each agency's ratings, and corresponding WPS variable codes, along with the years in which these variables are available. The attributes cover aspects such as labor management, health and safety, HCD, supply chain management, community contributions, customer engagement, and vision and strategy. We create indicators for these attributes and aggregate them to create the DIY social scores.

Second, we use MSCI ESG KLD's social scores for single-unit establishments that can be unmasked and linked to firms based on financial statement data. Specifically, establishments with identical total assets and sales revenue in a given year within the same two-digit industry between the WPS data and TS2000 (a database comparable to U.S. Compustat) are assigned unique firm identifiers from TS2000 along with their corresponding MSCI ESG KLD social scores. We focus on the employee score, a subcomponent of the social score that reflects labor relations. These social scores are available from 2011 to 2019 for about half of publicly traded companies (801 firms in 20111 and 875 in 2019). This subset includes 37 such firms, which is further reduced to 31 after excluding those with unusually high time-series variation in employee scores (above the 90th percentile, likely due to rating agency errors) and 30 firms after removing one outlier with an employee score above 60. These two approaches complement each other: the first provides noisy scores for a larger sample of establishments (95 for MSCI ESG KLD, as shown in Table IA2), including private companies, while the second offers actual scores for a smaller subsample.

Table 2, Panel E shows that *management-perceived relational quality* is positively and significantly correlated (at the 5% and 1% levels) with all three DIY social scores as well as MSCI ESG KLD's employee score. In contrast, *employee-perceived relational quality* shows no significant correlation with any of these scores, likely because both the DIY social scores and actual employee scores are based primarily on information provided by management through surveys and disclosures. Internet Appendix Figure IA1 visualizes the relationship between the actual employee scores and relational quality perceived by employees or management, using scatter plots with fitted lines. Only *management-perceived relational quality* shows a positive and significant correlation. If ESG ratings rely solely on *management-perceived relational quality* to assess bilateral factors like labor relations, they may fail to capture the full picture and may not explain future outcomes that require input from both sides. Indeed, column (3) of Table 5 shows that *management-perceived relational quality*, which is significantly correlated with the DIY social scores and the actual employee score, does not have a significant association with future outcomes such as profitability, labor productivity, or employee turnover.

6 Discussions and robustness checks

6.1 Visual inspection of outcome balance and causal relations

Figure 3 presents a binned scatterplot that compares *relational quality* (x-axis) and each outcome in the present (gray) or subsequent (black) survey year (y-axis), using a pair of 20 dots and a fitted line that summarizes the relationship. Panel A excludes stratum-year fixed effects and control variables, while Panel B includes them, in the

estimation process. The analysis considers four outcomes: return on assets (top left subpanel), profit margin (top right subpanel), labor productivity (bottom left subpanel), and employee turnover (bottom right subpanel).

Panel A shows that *without* fixed effects and controls, the estimated association between *relational quality* and both contemporary and future outcomes is unclear. The slopes of the gray and black fitted lines are close to zero in all subpanels. For return on assets, the slopes are slightly distant from zero but negative. On the contrary, Panel B reveals that *with* fixed effects and controls, the estimated association of *relational quality* becomes apparent only with future outcomes. The slope of the gray fitted line remains close to zero across all subpanels, while the slope of the black fitted line notably deviates from zero. The slope is positive for return on assets, profit margin, and labor productivity and negative for employee turnover.

The lack of contemporary association (gray lines) aligns with Table 3, which reports insignificant within-stratum-year differences in means between high and low-*relational quality* establishments for each outcome. The presence of intertemporal association (black lines) aligns with Table 5, which reports the statistically significant within-stratum-year association between *relational quality* and each outcome. The exception of a positive contemporary association between *relational quality* and labor productivity (gray line) is also consistent with Table 3, which reports significantly higher labor productivity for high *relational quality* establishments. As discussed, this could be attributed to *relational quality* immediately enhancing productivity, as the reverse scenario of productivity improving relational quality through profits and wages is not supported. *Relational quality* is insignificantly associated with profitability, as shown in Table 3 and Figure 3, Panel B, as well as per-employee wages, as shown in Table 3.

Internet Appendix Figure IA2 compares the relative importance of fixed effects and control variables and shows that fixed effects account for the absence of contemporary associations and the presence of intertemporal associations between *relational quality* and outcomes. In Panel A, controls are included (while fixed effects are excluded), resulting in blurred contemporary and intertemporal associations, similar to Figure 3, Panel A. In Panel B, fixed effects are included (while controls are excluded), leading to blurry contemporary associations and vivid intertemporal associations, similar to Figure 3, Panel B.

6.2 Robustness to complete randomness

One may concern about the potential non-random evolution of establishment characteristics since the initial sampling years of 2005 and 2015, which could result in non-random dropouts of certain establishments, say, following business failure. To address this concern, the KLI implements measures. One approach is to replenish the dropped establishments with newly sampled ones, which make up approximately 13% of the sample in each survey year. Fur-

thermore, we conduct a robustness check by reestimating the association between *relational quality* and future outcomes (return on assets, profit margin, labor productivity, and employee turnover) only using the sample of establishments from 2005 and 2015. Internet Appendix Table IA8 shows that the coefficients on *relational quality* are comparable in magnitude to those from our baseline regressions. Specifically, they represent 86.8%, 101.1%, 79.6%, and 170.2% of the magnitude of the coefficients on *relational quality* in column (1) of Table 5. However, these coefficients are statistically insignificant, likely due to the smaller sample size, which results in insufficient test power. The two-year sample accounts for only 32.9% (550/1673) of the observations.

6.3 Robustness to respondent effects

Collecting responses from representatives (union representatives and HR managers) instead of all employees and managers has advantages and disadvantages. On the positive side, this approach allows for a more comprehensive exploration of various aspects and issues, as many questions can be asked with less concern about low response rates. Moreover, these responses obtained from representatives may provide more polished perspectives compared to those collected from a large number of anonymous individuals. However, this approach raises questions about how accurately the representative represents the average perception of each represented party. Our proxy for relational quality may be influenced by distortions and biases of the representatives themselves, which we refer to as the respondent effect. As respondents change, their responses to the same questions may also change. Union representatives, who represent employees but report to management, may be more susceptible to the respondent effect compared to HR managers, who both represent and report to management. Moreover, if senior among employees, union representatives may be less reluctant to incorporate personal views into their responses compared to HR managers, who consistently hold a subordinate position to management.

Internet Appendix Table IA9 presents evidence of the respondent effect over time, although it does not drive our main findings. We conduct tests in three steps. First, we calculate the respondent replacement frequency for each establishment by dividing the number of respondents answering the survey questions on behalf of employees by the number of years for which the establishment is surveyed. Second, we use the median of this ratio to divide the sample into establishments with high and low respondent replacement frequencies. Finally, we reestimate the association between *relational quality* and future outcomes separately using these two subsamples.

Panel A shows that our main results remain robust in the subsample of establishments with low respondent replacement frequencies, indicating that they are not driven by the respondent effect. The coefficients on *relational quality* are similar in magnitude to those obtained in our baseline regressions and significant at the 5% level

in columns (2) and (3). Specifically, the coefficients are 0.0059, 0.0092, 0.0992, and -0.0967 in columns (1) to (4), representing 111.3%, 104.5%, 101.6%, and 148.8% of the magnitudes of the coefficients on *relational quality* in column (1) of Table 5. Panel B reveals that our main results are weakened in the subsample of establishments with high respondent replacement frequencies, suggesting the presence of the respondent effect. The coefficients on *relational quality* in columns (1) to (4) are 0.0036, -0.0016, 0.0312, and 0.0005, respectively.

6.4 Robustness to the exclusion of controls and singletons

In Internet Appendix Table IA3, Panel A shows that our main findings are robust to the choice of control variables. These variables influence not only the error term in Equation 1, which may correlate with *relational quality*, but also impact the sample size as discussed in Section 2.4. The consistency of results, with or without controls, corroborates the covariate balance and the randomness of *relational quality*. In this regard, we reproduce our main results using the sample that excludes control variables listed in Section 3 and is not limited to observations with non-missing controls. This treatment increases the number of observations from 1673 to 1745. The coefficients on *relational quality* are similar in magnitude to those obtained in our baseline regressions and significant at the 10%, 1%, and 1% levels in columns (1), (2), and (3). The coefficients are 0.0047, 0.0083, 0.0887, and -0.0261, representing 88.7%, 94.3%, 90.9%, and 40.2% of the magnitudes of the coefficients on *relational quality* in column (1) of Table 5.

Panel B shows that our main findings are robust to the exclusion of singletons, which can introduce bias in coefficient estimates and standard errors when fixed effects are nested within clusters in regression models (Correia (2015)). Singletons, in our context, refer to establishments belonging to a stratum with only one establishment in a given survey year and establishments not surveyed in two consecutive survey years. We reproduce our main results using a sample that excludes singletons, resulting in a decrease in the number of observations from 1673 to 1375. The coefficients on *relational quality* are similar in magnitude to those obtained in our baseline regressions and significant at the 5%, 1%, 1%, and 10% levels in columns (1) to (4). They are 0.0053, 0.0088, 0.0975, and -0.0652, representing 100%, 100%, 99.9%, and 100.3% of the magnitudes of the coefficients on *relational quality* in column (1) of Table 5.

6.5 Longer-run effects

Internet Appendix Table IA10 provides further validation of our proxy for relational quality, which captures relatively short-lived perception-based aspects of a lasting factor. It shows that our main findings do not hold when we examine the association between *relational quality* and outcomes over an extended period of time, spanning two or

three survey years (equivalent to four or six calendar years). This analysis tests whether our results hold only inside our tightly designed laboratory, described in Section 3, and aims to address the concern that unobserved long-lasting factors influence our proxy for relational quality and subsequently outcomes in the long run. The table shows that there is no significant association between *relational quality* and profitability, labor productivity, and retention over a four-year period in Panel A or a six-year period in Panel B. The coefficients on *relational quality* are small in magnitude and fail to reach conventional levels of statistical significance. An exception is labor productivity, for which the coefficient remains significant at the 5% level in Panel A.

6.6 Establishment survival

Table IA11 examines the association between *relational quality* and future survival, measured by the number of calendar years until the last reported survey year[29]. This analysis excludes 2019, the last survey year with no variation in future survival for establishments from 2017, the preceding survey year. Columns (1) to (3) show that establishments with higher *relational quality* remain in existence for more years. The coefficient on *relational quality* is positive and significant at the 5% level, while those for *employee-assessed relational quality* and *management-assessed relational quality* are insignificant. Columns (4) to (6) show that the cultural and dispute dimensions of relational quality drive the significant intertemporal association observed in column (1). The coefficients for *relational quality: culture* and *relational quality: dispute* are positive and significant at the 10% and 5% levels, respectively, while the coefficient for *relational quality: policy* is insignificant. The (marginally) significant result for the cultural dimension aligns with findings in Table 5. The significant association with the dispute dimension - absent for other near-term outcomes in Table 5 - suggests that establishments with any disputes perceived less hostile by employees than management tend to have greater longevity.

[29] Two key challenges arise in analyzing long-term outcomes, such as survival, within our experimental setting. The first challenge is the inevitable serial correlation in outcomes, which violates the outcome balance assumption. For instance, if the number of years until the last reported survey years is 6 in 2009, it is 8 in 2007. The intertemporal relationship between relational quality and future outcomes (e.g., in 2009) creates a contemporaneous association (e.g., in 2007), as outcomes overlap with information from future years. As a result, we refrain from drawing causal inferences from the survival results and exclude them from the main tests. The second challenge is the variation in the number of years until the last reported survey year across establishments surveyed in different years. While this variation is less concerning for statistical significance - since we compare establishment characteristics a survey year apart for each survey cohort (e.g., 2005 relational quality predicting 2007 outcomes, 2007 relation quality predicting 2009 outcomes, etc.) - it complicates the interpretation of the economic magnitude of the coefficients, which are averages across survey years. A straightforward alternative is to cap the number of survival years, equalizing the maximum across survey years, or to estimate survival likelihood over a fixed future time horizon. However, while these methods improve interpretability, they introduce sample truncation for establishments surveyed in later years, reducing the sample size and, thus, the testing power of the analysis.

7 Conclusion

This paper aims to quantify labor-management relational quality and examine its causal impact on establishment outcomes, including profitability, labor productivity, and retention. To assess relational quality, we utilize data collected from both employees and management through a survey containing common questions about their relationship. Our research design leverages stratified random sampling used for subject selection. We employ a stratum-year fixed effects model to estimate the relationship between relational quality and establishment outcomes in the subsequent survey year. Our findings reveal a positive and significant association between relational quality and future outcomes. Notably, we find that evaluating relational quality based solely on employee or management responses does not demonstrate significant associations with outcomes, underscoring the importance of evaluating bilateral factors based on input from both parties involved. Further, the cultural dimension of relational quality emerges as a key driver of the observed results. The results are more pronounced among establishments that invest in the HCD of their rank-and-file employees, who also exhibit greater sensitivity to relational quality in their mobility decisions, as well as among establishments that belong to privately-held firms.

The findings of this paper have implications for various stakeholders, including firms, investors, and regulators. For *firms*, the results indicate that investing in labor relations yields positive returns. High relational quality enhances employee motivation, improves retention, and leads to increased future profits. We provide guidance on specific aspects of relational quality to focus on, such as effective information sharing, an atmosphere of mutual trust, and involving employees in major decisions that impact their working conditions. These recommendations align with broader suggestions for cultural improvement within organizations, as proposed by Graham et al. (2022), as a means of enhancing firm value. For *investors*, the results suggest that firms with higher relational quality offer superior returns compared to other investment options. Investors will benefit from identifying and investing in firms that prioritize and excel in relational quality if they could quantify this intangible factor at low costs and identify firms with higher relational quality before others. For *regulators*, the findings highlight a potential limitation of disclosure requirements, such as the proposed rule changes by the U.S. Securities and Exchange Commission (SEC) regarding climate-related risks[30]. For bilateral ESG factors, the effectiveness of disclosure requirements in mitigating ESG risks will depend not only on the truthfulness of a firm's disclosures but also on the alignment of perceptions between the parties involved. The implication may well apply to factors involving more than two parties or factors that involve parties beyond the boundaries of a firm, such as customer-supplier relations (Titman

[30] `https://www.sec.gov/news/press-release/2022-46`

(1984), Kale and Shahrur (2007), Banerjee et al. (2008)).

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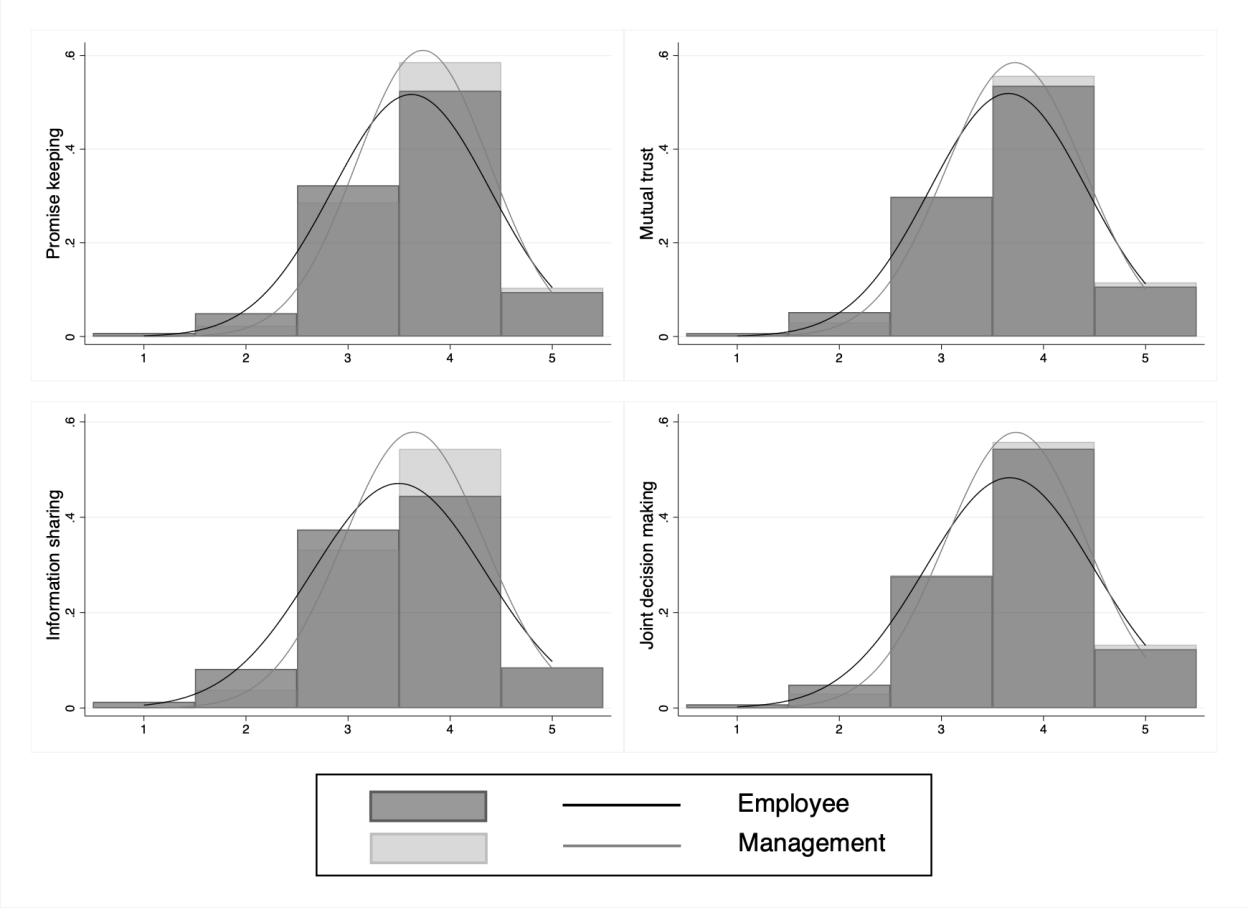
Figure 1: Employee versus management scores

This figure depicts the normal density of eight scores for employees (shown in black) and management (shown in gray). Panel A features four culture scores, representing responses on a five-point scale to questions about promise-keeping, mutual trust, information sharing, and joint decision-making. Panel B includes two policy scores in the top subpanels, reflecting responses on a three-or-four-point scale to questions about management's policies toward the union and the union's policies toward management. The bottom subpanels present two dispute scores, representing responses on a five-point scale to questions about quarrels over trifles and hostility between employees and management. The survey questions and choices are detailed in Table 1. The data is from Korea Labor Institute (KLI)'s Workplace Panel Survey, covering the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Strata are defined by industry, region, and size for 2005-2013 and by industry and size for 2015-2019.

Panel A. Culture



Panel B. Policy and dispute

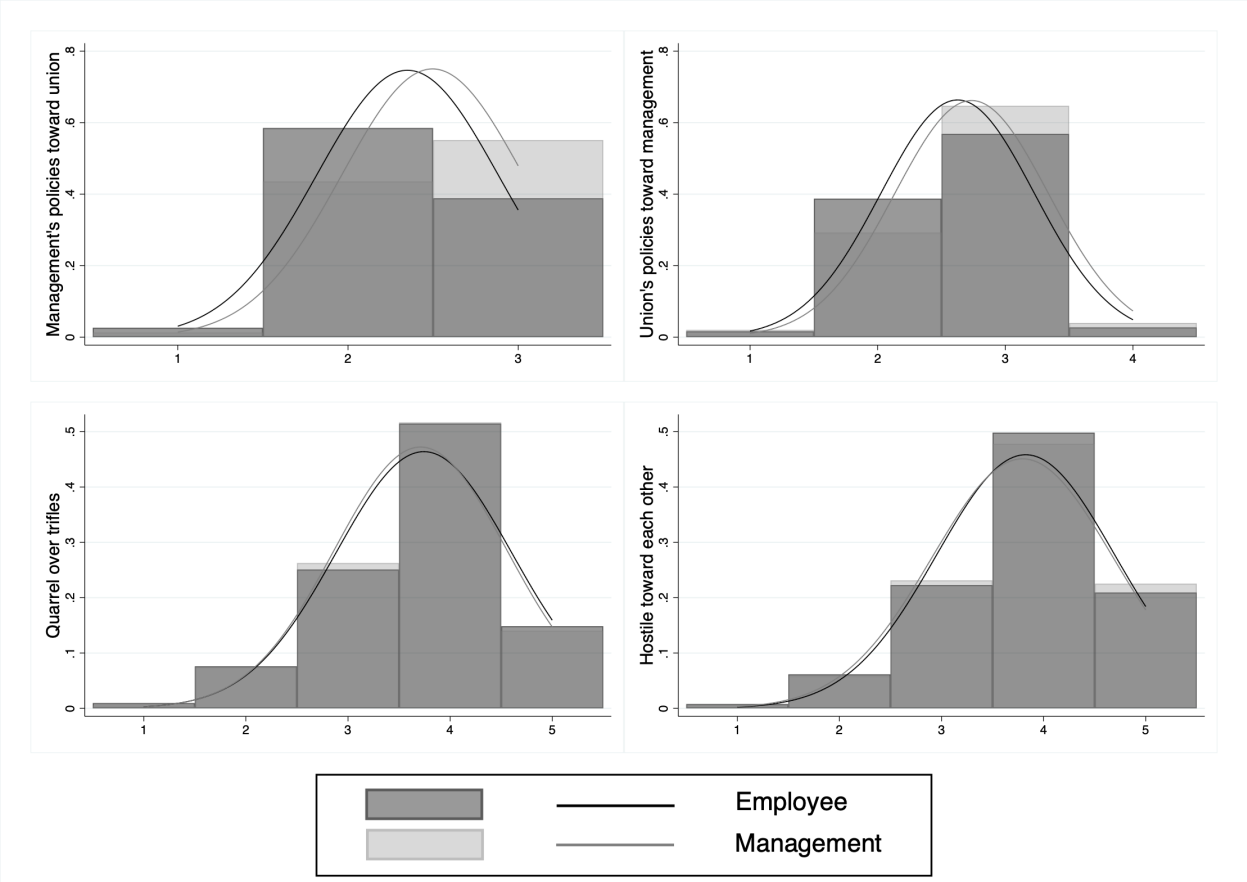
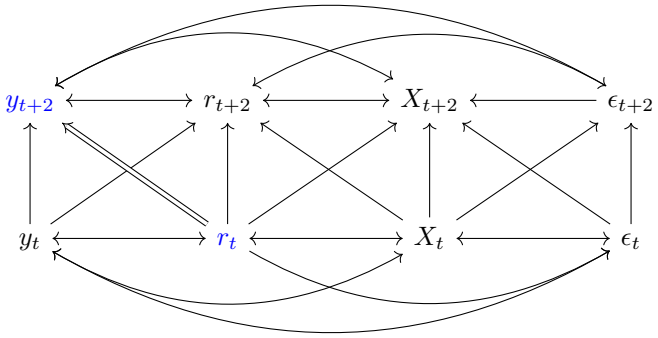


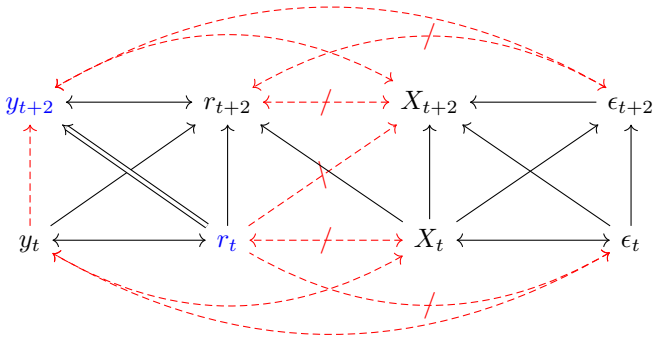
Figure 2: Schematic diagram for causal inference

This figure illustrates all possible directional links among establishment characteristics across two subsequent survey years. As in the reduced-form model in Equation 1, y represents the outcome variable, r relational quality, X a vector of observable characteristics, and ϵ unobservable characteristics. "/" is used to mark edges that are disconnected due to covariate balance in Panels B and C, and "//" is used to denote edges additionally severed by outcome balance in Panel C. Dashed lines without these markings ("/" or "//") represent links indirectly cut as a result of the marked disconnections.

Panel A. Without any



Panel B. With covariate balance



Panel C. With covariate balance and outcome balance

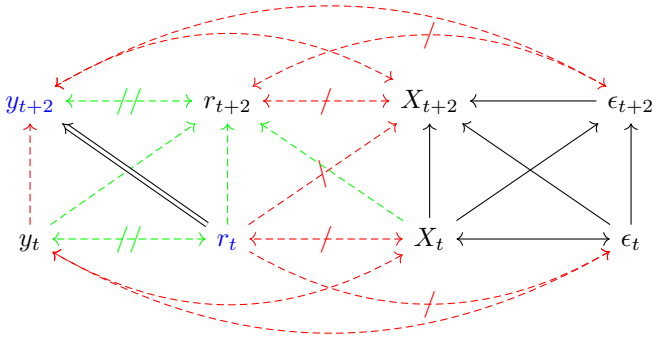
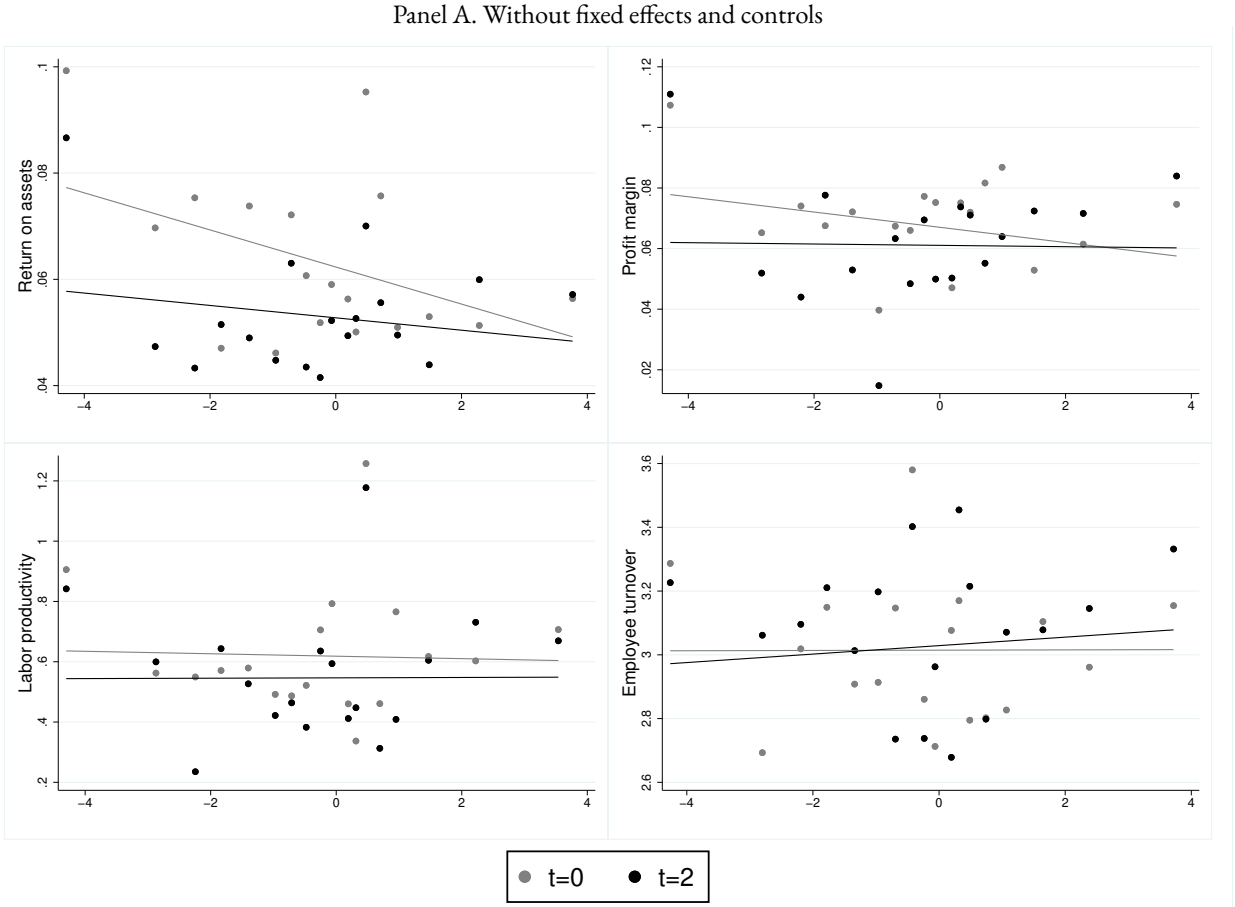


Figure 3: Relational quality and establishment outcomes

This figure displays binned scatterplots that compare relational quality on the x-axis with contemporary establishment outcomes (shown in gray) and following survey-year establishment outcomes (shown in black) on the y-axis. Panel A displays the relationships without control variables and stratum-year fixed effects, while Panel B includes them. The relationships are depicted by 20 dots and a fitted line. *Relational quality* is calculated as the first principal component of the differences in employee and management scores, which are numeral responses to a set of eight common questions answered by the union representative and human resource manager on behalf of employees and management. The survey questions and choices are detailed in Table 1. The establishment outcomes considered in the subpanels arranged from the top-left to bottom-right corners include return on assets, profit margin, labor productivity, and employee turnover. These variables are defined in Table 5. Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI.

Panel A. Without fixed effects and controls



Panel B. With fixed effects and controls

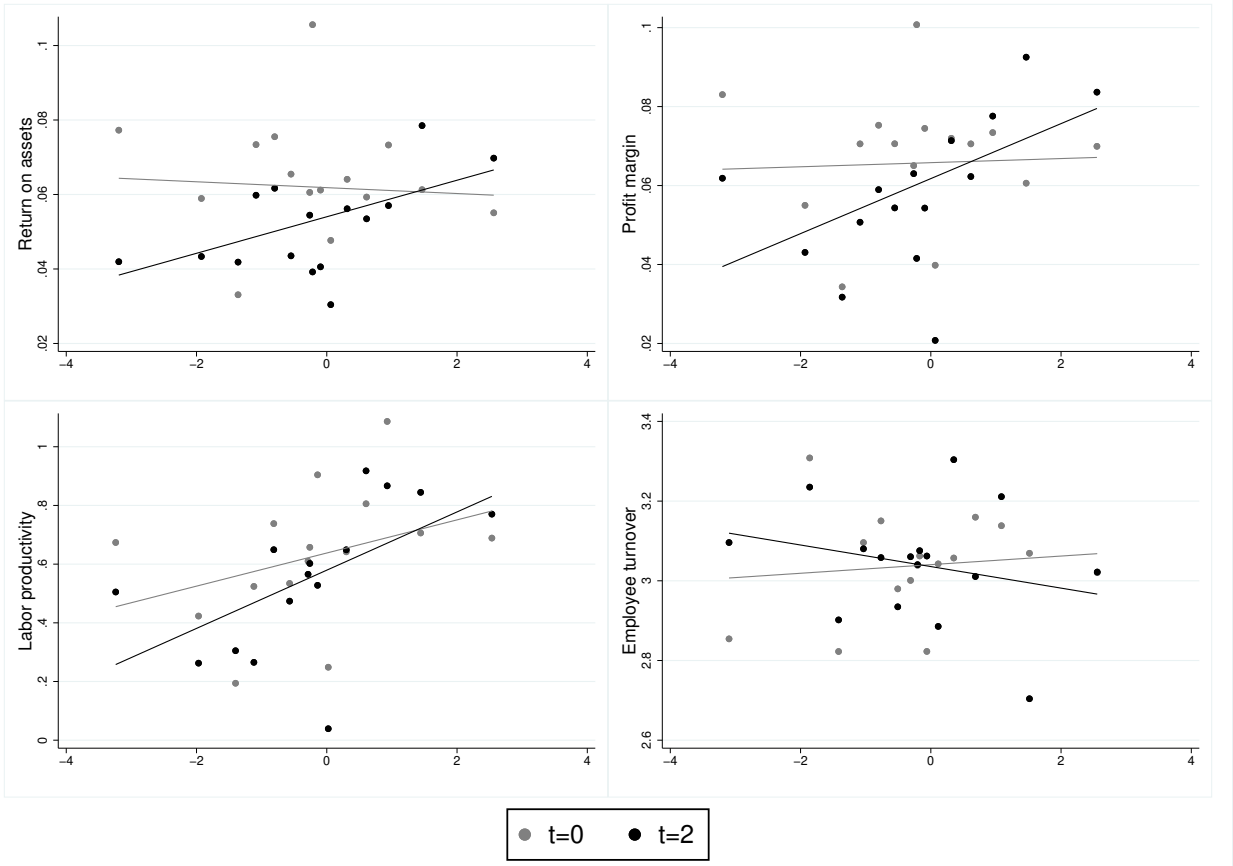


Table 1: Survey questionnaire

This table presents eight common questions posed to employees and management about their relationship, along with the corresponding response options. The questions are answered by the union representative and human resource manager on behalf of employees and management, respectively. Respondents can provide their answers on a five-point scale for four culture-related questions and two dispute-related questions and on a three or four-point scale for two policy-related questions. The Korea Labor Institute has conducted this survey biennially since 2005. The latest available survey year at the time of this writing is 2019.

Questions	Choices
Culture	
Labor and management both keep their promises	1) strongly disagree; 2) disagree; 3) neutral; 4) agree; 5) strongly agree
Negotiations take place in an atmosphere of mutual trust	1) strongly disagree; 2) disagree; 3) neutral; 4) agree; 5) strongly agree
Labor and management share information	1) strongly disagree; 2) disagree; 3) neutral; 4) agree; 5) strongly agree
Labor and management jointly decide major changes to working conditions	1) strongly disagree; 2) disagree; 3) neutral; 4) agree; 5) strongly agree
Policy	
The management's policies toward the union	1) weaken or disband the union 2) acknowledge the union but minimize its participation 3) respect the union as a partner and have it actively involved in management
The union's policies towards the management	1) minimize the control of the management 2) acknowledge the management but are uncooperative on issues against the union's interests 3) protect the employees' long-run interests by cooperating with the management 4) do not represent the employees' interests and cooperate with the management
Dispute	
Labor and management frequently quarrel over trifles	1) strongly disagree; 2) disagree; 3) neutral; 4) agree; 5) strongly agree
Labor and management are hostile toward each other	1) strongly disagree; 2) disagree; 3) neutral; 4) agree; 5) strongly agree

Table 2: Correlations of relational quality

This table reports the correlation coefficients between two sets of variables. The first set includes *relational quality*, *employee-perceived relational quality*, and *management-perceived relational quality* in columns (1) to (3). These variables are the first principal components of the differences in employee and management scores, employee scores, and management scores. The employee and management scores represent numeral answers to a set of eight common questions answered by the union representative and human resource manager on behalf of employees and management. The survey questions and choices are detailed in Table 1. Panel A displays pairwise correlations among these three variables. The second set of variables includes various labor relations events and social scores. The labor relations events include agreements between employees and management on wages, changes in working conditions, and job security in Panel B, the disagreement on wage increase rates in Panel C, and employees' actions against management in Panel D. The variables $\Delta_e W$, $\Delta_m W$, and ΔW^* represent the employee-proposed wage increase rate, management-proposed wage increase rate, and the agreed-upon wage increase rate between employees and management, respectively. In Panel E, do-it-yourself (DIY) social scores approximate the social scores of MSCI ESG KLD, S&P Global Ratings, and Bloomberg, based on attributes available from the Korea Labor Institute's Workplace Panel Survey, as listed in Table IA7. The actual employee score, a subcomponent of MSCI ESG KLD's social score that reflects labor relations, is also included and available from 2011 to 2019. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Table A1 defines all variables. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Relational quality	(2) Employee-perceived relational quality	(3) Management-perceived relational quality
Panel A.			
Relational quality	1.000		
Employee-perceived relational quality	0.6127***	1.000	
Management-perceived relational quality	-0.3915***	0.4847***	1.000
Panel B. Agreement on			
Wage issues	0.0802***	0.0514**	-0.0282
Working conditions	0.0667***	0.0554***	-0.0136
Job security	0.0832***	0.0437**	-0.0461**
Panel C. Disagreement on wage increase rates			
# Wage negotiations	-0.049**	-0.0681***	-0.0281
$\Delta_e W$ - $\Delta_m W$	-0.1046***	-0.1566***	-0.0620***
$\Delta_e W$ - ΔW^*	-0.0978***	-0.1599***	-0.0729***
ΔW^* - $\Delta_m W$	-0.0467**	-0.0500**	-0.0064
Per-employee wage	-0.0201	-0.0099	0.0079
Panel D. Actions against management			
Work to rule	-0.0592***	-0.0833***	-0.0339*
Strike	-0.0080	-0.1101***	-0.1182***
Panel E. DIY and actual social scores			
DIY MSCI ESG KLD	-0.1874**	0.1435	0.3629***
DIY S&P Global Ratings	-0.0814	0.0196	0.1053**
DIY Bloomberg	-0.2262**	0.0937	0.3468***
MSCI ESG KLD employee	-0.4586**	0.0864	0.4643**

Table 3: Covariate and outcome balances

This table compares establishment characteristics between those with high *relational quality* (above the sample median) and low *relational quality* (below the sample median) in columns (1) and (2). *Relational quality* is defined in Figure 3. Column (3) displays the difference in means for each characteristic between establishments with high and low *relational quality*, along with its standard error in column (4). Columns (5) and (6) report the difference in means and its standard error, estimated within each stratum and year. These estimates are derived from a stratum-year fixed effects regression model, with the dependent variable being each characteristic and the independent variable being *relational quality*. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Table A1 defines all variables. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Relational quality		(1)-(2)	S.E.	(1)-(2) within stratum-year	S.E.
	High	Low				
Outcome variables						
Return on assets	0.059	0.063	-0.003	0.007	-0.0033	0.007
Profit margin	0.060	0.055	0.005	0.008	0.0023	0.007
Labor productivity	0.623	0.471	0.153*	0.093	0.1800**	0.078
Employee turnover	3.116	3.097	0.019	0.117	0.0411	0.091
Covariates including controls						
Establishment size	10.689	10.607	0.081	0.108	0.0710	0.090
Employment size	4.967	4.970	-0.003	0.067	-0.0023	0.040
Establishment age	3.259	3.243	0.016	0.039	0.0039	0.038
Leverage	0.522	0.534	-0.011	0.020	-0.0059	0.017
Capital intensity	0.426	0.420	0.006	0.017	0.0006	0.016
Intangible investment	0.020	0.018	0.003	0.004	0.0041	0.004
Per-employee wage	4.049	3.993	0.056	0.088	0.0662	0.0734
Merit pay	0.237	0.246	-0.011	0.032	0.0339	0.032
Stock option	0.030	0.032	-0.002	0.012	0.0022	0.009
ESOP	0.106	0.107	-0.001	0.021	-0.0037	0.019
Covariates including controls from the subsequent survey year						
Establishment size$_{t+2}$	10.965	10.984	-0.019	0.132	-0.0662	0.108
Employment size$_{t+2}$	5.224	5.129	0.094	0.086	0.0024	0.058
Establishment age$_{t+2}$	3.351	3.340	0.011	0.049	-0.0333	0.047
Leverage$_{t+2}$	0.500	0.520	-0.020	0.024	-0.0192	0.023
Capital intensity$_{t+2}$	0.406	0.412	-0.006	0.019	0.0093	0.018
Intangible investment$_{t+2}$	0.024	0.017	0.007	0.006	0.0103*	0.006
Per-employee wage$_{t+2}$	3.966	4.062	-0.096	0.090	-0.0035	0.077
Merit pay$_{t+2}$	0.227	0.216	0.011	0.042	0.0338	0.027
Stock option$_{t+2}$	0.049	0.026	0.024	0.027	0.0241	0.024
ESOP$_{t+2}$	0.094	0.142	-0.048*	0.027	-0.0269	0.020

Table 4: Transition probabilities

This table reports the probabilities of an establishment transitioning from one bin on the y-axis to another bin on the x-axis in the subsequent survey year. The establishments are categorized into four within-stratum-year bins based on the quartiles of relational quality in Panel A, *employee-perceived relational quality* in Panel B, and *management-perceived relational quality* in Panel C. The sample includes stratum-years with a minimum of four establishments. The last column shows the sum of probabilities, while the last row displays the proportion of establishments in each bin. *Relational quality*, *employee-perceived relational quality*, and *management-perceived relational quality* are defined in Table 2. The table utilizes shades of gray to highlight the figures in the ranges [0, 10), [10, 20), [20, 30), [30, 40), and [40, 50), with darker shades indicating higher values. The figures are presented as percentages. The data is described in Figure 1 and covers the years 2005 to 2019.

Panel A. Relational quality	1	2	3	4	Total
1	42.8	24.4	17.9	14.9	100
2	35.6	25.9	24.1	14.4	100
3	23.1	26.5	30.7	19.8	100
4	27.6	21.9	25.2	25.2	100
Total	33.8	24.8	23.7	17.8	100

Panel B. Employee-perceived relational quality	1	2	3	4	Total
1	45.6	25.6	17.9	11.0	100
2	32.6	29.8	22.9	14.7	100
3	27.9	25.2	29.1	17.8	100
4	24.2	21.1	24.7	29.9	100
Total	34.3	25.8	23.0	16.9	100

Panel C. Management-perceived relational quality	1	2	3	4	Total
1	46.9	24.7	19.4	9.0	100
2	31.9	32.6	23.6	11.8	100
3	24.1	24.1	33.3	18.4	100
4	16.8	20.0	21.6	41.6	100
Total	32.3	25.8	24.2	17.6	100

Table 5: Relational quality and near-term establishment outcomes

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in the subsequent survey year. Panels A to D examine the establishment outcomes of return on assets, profit margin, labor productivity, and employee turnover, respectively. Return on assets and profit margin measure profitability. Labor productivity is calculated as the ratio of earnings before interest and taxes plus payroll to payroll, and employee turnover as the log of one plus the number of outgoing and incoming employees. The regressors in columns (1) to (6) are *relational quality*, *employee-perceived relational quality*, *management-perceived relational quality*, *relational quality: culture*, *relational quality: culture*, and *relational quality: culture*. The first three regressors are the first principal component (PC) of the differences between employee and management scores, employee scores, and management scores, respectively. The last three regressors are the first PCs of the differences in numerical answers between employees and management for four culture-related questions, two policy-related questions, and two dispute-related questions, respectively. The survey questions and choices are detailed in Table 1. Control variables include establishment size, employment size, establishment age, financial leverage, capital intensity, intangible investment, and per-employee wage, and are defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Return on assets

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	Return on assets$_{t+2}$					
Relational quality	0.0053**					
	(0.003)					
Employee-perceived relational quality		0.0025				
		(0.002)				
Management-perceived relational quality			-0.0020			
			(0.002)			
Relational quality: culture				0.0072**		
				(0.003)		
Relational quality: policy					-0.0024	
					(0.004)	
Relational quality: dispute						0.0013
						(0.004)
Controls	Y	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y	Y
# Observations	1673	1673	1673	1673	1673	1673
Adjusted R^2	0.208	0.201	0.200	0.213	0.200	0.199

Panel B. Profit margin

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)
	Profit margin$_{t+2}$					
Relational quality	0.0088***					
	(0.003)					
Employee-perceived relational quality		0.0048				
		(0.003)				
Management-perceived relational quality			-0.0028			
			(0.003)			
Relational quality: culture				0.0113***		
				(0.003)		
Relational quality: policy					0.0007	
					(0.006)	
Relational quality: dispute						0.0021
						(0.004)
Controls	Y	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y	Y
# Observations	1673	1673	1673	1673	1673	1673
Adjusted R^2	0.145	0.138	0.134	0.151	0.133	0.133

Panel C. Labor productivity

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)
	Labor productivity$_{t+2}$					
Relational quality	0.0976***					
	(0.031)					
Employee-perceived relational quality		0.0726**				
		(0.034)				
Management-perceived relational quality			-0.0101			
			(0.031)			
Relational quality: culture				0.1132***		
				(0.035)		
Relational quality: policy					0.0789	
					(0.053)	
Relational quality: dispute						0.0242
						(0.039)
Controls	Y	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y	Y
# Observations	1673	1673	1673	1673	1673	1673
Adjusted R^2	0.324	0.320	0.313	0.326	0.315	0.313

Panel D. Employee turnover

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)
	Employee turnover$_{t+2}$					
Relational quality	-0.0650*					
	(0.036)					
Employee-perceived relational quality		-0.0381				
		(0.033)				
Management-perceived relational quality			0.0168			
			(0.034)			
Relational quality: culture				-0.0706*		
				(0.038)		
Relational quality: policy					-0.0257	
					(0.049)	
Relational quality: dispute						-0.0484
						(0.052)
Controls	Y	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y	Y
# Observations	1673	1673	1673	1673	1673	1673
Adjusted R^2	0.453	0.450	0.449	0.453	0.449	0.450

Table 6: Heterogeneous employee responses

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts retention and hiring in the subsequent survey year. Retention and hiring are measured by the log of one plus the number of outgoing employees, incoming employees, incoming regular employees, incoming temporary employees, incoming inexperienced regular employees, and incoming experienced regular employees in columns (1) to (6), respectively. The regressor is *relational quality*, as defined in Table 5. Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	# Outgoing employees$_{t+2}$	# Incoming employees$_{t+2}$	# Incoming regular employees$_{t+2}$	# Incoming temporary employees$_{t+2}$	# Incoming inexperienced regular employees$_{t+2}$	# Incoming experienced regular employees$_{t+2}$
Relational quality	-0.0676**	-0.0646*	-0.0824**	-0.0218	-0.1151***	-0.0020
	(0.034)	(0.035)	(0.035)	(0.027)	(0.035)	(0.030)
Controls	Y	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y	Y
# Observations	1673	1673	1673	1673	1673	1673
Adjusted R^2	0.440	0.415	0.323	0.338	0.269	0.259

Table 7: Heterogeneous effects on establishments with varying relational quality

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in the subsequent survey year. The sample is divided based on the median of the average stratum-year relational quality. Odd-numbered (resp. even-numbered) columns analyze establishments with low (resp. high) average stratum-year relational quality. The establishment outcomes represent return on assets (columns (1) and (2)), profit margin (columns (3) and (4)), labor productivity (columns (5) and (6)), employee turnover (columns (7) and (8)), and the log of one plus the number of outgoing employees (columns (9) and (10)). They are defined in Table 5. The regressor is *relational quality*, as defined in Table 5. Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dep. Var.	Return on assets$_{t+2}$		Profit margin$_{t+2}$		Labor productivity$_{t+2}$		Employee turnover$_{t+2}$		# Outgoing employees$_{t+2}$	
Sample with stratum-year relational quality being..	low	high	low	high	low	high	low	high	low	high
Relational quality	0.0067*	0.0024	0.0124***	0.0032	0.1491***	0.0353	-0.0555	-0.0705	-0.0807*	-0.0389
	(0.004)	(0.003)	(0.004)	(0.004)	(0.048)	(0.034)	(0.047)	(0.056)	(0.042)	(0.055)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Strata-Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Robust SE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
# Observations	865	808	865	808	865	808	865	808	865	808
Adjusted R^2	0.201	0.250	0.123	0.220	0.345	0.293	0.570	0.307	0.541	0.299

Table 8: Heterogeneous effects based on varying human capital importance

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in the subsequent survey year. The establishment outcomes represent return on assets (columns (1) to (4)) and profit margin (columns (5) to (8)) in Panel A and labor productivity (columns (1) to (4)) and employee turnover (columns (5) to (8)) in Panel B. They are defined in Table 5. The regressors are *relational quality*, a mediator variable, and their interaction term. *Relational quality* is defined in Table 5. The mediator variable is an indicator that takes the value of one if an establishment offers job training to field employees in columns (1) and (5), field supervisors in columns (2) and (6), and R&D experts in columns (3) and (7), and zero otherwise. Columns (4) and (8) include labor intensity, calculated as the inverse of property, plant, and equipment divided by total assets. Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Profitability

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Return on assets$_{t+2}$				Profit margin$_{t+2}$			
Relational quality (RQ)	-0.0036	0.0008	0.0090	0.0052*	-0.0043	0.0056	0.0125*	0.0090***
	(0.004)	(0.004)	(0.006)	(0.003)	(0.007)	(0.010)	(0.007)	(0.003)
Job training (JT) for field employees$_{t-2}$	0.0108				0.0364**			
	(0.011)				(0.016)			
RQ x JT for field employees$_{t-2}$	0.0173**				0.0273***			
	(0.007)				(0.010)			
JT for field supervisors$_{t-2}$		-0.0283**				-0.0482**		
		(0.014)				(0.019)		
RQ x JT for field supervisors$_{t-2}$		0.0098				0.0094		
		(0.007)				(0.011)		
JJT for R&D experts$_{t-2}$			-0.0090				-0.0012	
			(0.011)				(0.018)	
RQ x JT for R&D experts$_{t-2}$			-0.0057				-0.0021	
			(0.007)				(0.011)	
Labor intensity				-0.0001				0.0001
				(0.000)				(0.000)
RQ x Labor intensity				0.0000				-0.0000
				(0.000)				(0.000)
Constant	0.2608***	0.2591***	0.2321***	0.0424	0.5097***	0.5169***	0.4737***	0.0171
	(0.073)	(0.081)	(0.074)	(0.062)	(0.159)	(0.163)	(0.167)	(0.113)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y	Y	Y	Y
# Observations	751	751	751	1673	751	751	751	1673
Adjusted R^2	0.345	0.346	0.320	0.198	0.347	0.336	0.311	0.143

Panel B. Labor productivity and employee turnover

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Labor productivity$_{t+2}$				Employee turnover$_{t+2}$			
Relational quality (RQ)	0.0137	0.0351	0.1252*	0.0990***	-0.0129	0.0046	0.0393	-0.0705*
	(0.061)	(0.069)	(0.067)	(0.032)	(0.099)	(0.110)	(0.104)	(0.037)
Job training (JT) for field employees$_{t-2}$	0.0908				-0.9876***			
	(0.218)				(0.261)			
RQ x JT for field employees$_{t-2}$	0.1889*				0.0492			
	(0.101)				(0.113)			
JT for field supervisors$_{t-2}$		-0.6843***				-0.3284*		
		(0.251)				(0.190)		
RQ x JT for field supervisors$_{t-2}$		0.1455				0.0583		
		(0.107)				(0.124)		
JT for R&D experts$_{t-2}$			0.0784				-0.1209	
			(0.228)				(0.225)	
RQ x JT for R&D experts$_{t-2}$			0.0077				0.0094	
			(0.119)				(0.130)	
Labor intensity				0.0017				-0.0000
				(0.001)				(0.001)
RQ x Labor intensity				-0.0001				0.0005
				(0.000)				(0.000)
Constant	3.4025**	3.7080**	3.1131*	-0.8066	0.6049	0.4804	0.1795	-0.4452
	(1.632)	(1.442)	(1.657)	(0.972)	(1.256)	(1.299)	(1.336)	(0.798)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y	Y	Y	Y
# Observations	751	751	751	1673	751	751	751	1673
Adjusted R^2	0.452	0.475	0.445	0.321	0.424	0.357	0.349	0.453

Table 9: Heterogeneous effects on private and public establishments

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in the subsequent survey year. The regressor is *relational quality*, public, and their interaction term. *Relational quality* is defined in Table 5. The variable, public, is an indicator that takes a value of one if an establishment belongs to a firm listed on KOSDAQ, KOSPI, or KONEX, and zero otherwise. The establishment outcomes in columns (1) to (4) represent return on assets, profit margin, labor productivity, and employee retention, respectively. They are defined in Table 5. Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2015 to 2019, for which the listing status of establishments is available. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dep. Var.	(1) Return on assets$_{t+2}$	(2) Profit margin$_{t+2}$	(3) Labor productivity$_{t+2}$	(4) Employee turnover$_{t+2}$
Relational quality	0.0121***	0.0145***	0.1270**	-0.1183*
	(0.004)	(0.004)	(0.049)	(0.061)
Public	-0.0321***	-0.0001	-0.5468***	0.1440
	(0.011)	(0.020)	(0.183)	(0.194)
Relational quality x Public	-0.0101	-0.0067	-0.0179	-0.0527
	(0.006)	(0.008)	(0.067)	(0.096)
Constant	0.0391	-0.0961	-1.6286	2.1878**
	(0.083)	(0.152)	(1.103)	(1.089)
Controls	Y	Y	Y	Y
Stratum-Year FE	Y	Y	Y	Y
# Observations	664	664	664	664
Adjusted R^2	0.278	0.186	0.360	0.461

Table 10: Managerial perception and corporate policies

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in the subsequent survey year. In column (1), the regressor is *relational quality*, while columns (2) to (5) include *relational quality*, a mediator variable, and their interaction term. *Relational quality* is defined in Table 5. The mediator variables used in Panels A, B, and C are debt to assets, capital expenditure, and per-employee wage, respectively. The establishment outcomes in columns (1) to (5) are the mediator variable, return on assets, profit margin, labor productivity, and employee retention, respectively. The outcomes in columns (2) to (5) are defined in Table 5. Control variables, listed in Tables 5 and defined in Table A1, are included in the regression models, except for financial leverage in Panel A and per-employee wage in Panel C. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Financing policy

Dep. Var.	(1) Debt to assets$_{t+2}$	(2) Return on assets$_{t+2}$	(3) Profit margin$_{t+2}$	(4) Labor productivity$_{t+2}$	(5) Employee turnover$_{t+2}$
Relational quality	-0.0064	0.0021	0.0171**	0.1934***	-0.1417**
	(0.006)	(0.005)	(0.007)	(0.067)	(0.065)
Debt to assets		-0.0564***	-0.1076***	-1.2213***	-0.2051
		(0.020)	(0.030)	(0.303)	(0.237)
Relational quality x Debt to assets		0.0062	-0.0161	-0.1849*	0.1481
		(0.009)	(0.011)	(0.110)	(0.125)
Constant	0.4943***	0.0839	0.0316	-0.5926	-0.3781
	(0.159)	(0.062)	(0.115)	(1.006)	(0.786)
Controls	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y
# Observations	1673	1673	1673	1673	1673
Adjusted R^2	0.239	0.208	0.147	0.326	0.454

Panel B. Investment policy

	(1) Capital expenditure$_{t+2}$	(2) Return on assets$_{t+2}$	(3) Profit margin$_{t+2}$	(4) Labor productivity$_{t+2}$	(5) Employee turnover$_{t+2}$
Relational capital	-0.0006	0.0051*	0.0084***	0.0955***	-0.0680*
	(0.003)	(0.003)	(0.003)	(0.031)	(0.036)
Capital expenditure		0.0436	0.1020	1.3507*	0.1339
		(0.059)	(0.074)	(0.790)	(0.897)
Relational quality x Capital expenditure		-0.0259	-0.0278	0.0881	-0.5110
		(0.036)	(0.040)	(0.393)	(0.463)
Constant	0.0423	0.0786	0.0362	-0.5348	-0.4751
	(0.048)	(0.061)	(0.112)	(0.995)	(0.788)
Controls	Y	Y	Y	Y	Y
Strata-Year FE	Y	Y	Y	Y	Y
# Observations	1673	1673	1673	1673	1673
Adj. R2	0.091	0.210	0.149	0.326	0.454

Panel C. Compensation policy

Dep. Var.	(1) Per-employee wage$_{t+2}$	(2) Return on assets$_{t+2}$	(3) Profit margin$_{t+2}$	(4) Labor product-ivity$_{t+2}$	(5) Employee turnover$_{t+2}$
Relational quality	-0.0099	-0.0039	0.0220	0.0540	0.0806
	(0.020)	(0.009)	(0.014)	(0.133)	(0.106)
Per-employee wage		0.0134	-0.0074	-0.5035***	-0.1381
		(0.009)	(0.013)	(0.158)	(0.120)
Relational quality x Per-employee wage		0.0023	-0.0033	0.0109	-0.0362
		(0.002)	(0.003)	(0.033)	(0.027)
Constant	2.1706***	0.0702	0.0552	-0.5440	-0.2917
	(0.540)	(0.061)	(0.110)	(1.015)	(0.812)
Controls	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y
# Observations	1673	1673	1673	1673	1673
Adjusted R^2	0.477	0.209	0.147	0.323	0.454

Table A1: Variable definitions

This table provides the definition of variables that capture establishment characteristics. Some of these variables are coded using the survey questions and corresponding choices listed in Table 1. The data is described in Figure 1. The financial statement figures collected at the firm level are converted into establishment-level figures, based on factors such as an establishment's contribution to the firm's sales. The conversion procedure is outlined in Internet Appendix Section A.

Variable name	Definition
Relational quality	First principal component (PC) of the differences in numerical answers of employees and management to eight common questions regarding their relationship
Employee-perceived relational quality	First PC of numerical answers of employees to eight common questions asked to employees and management regarding their relationship
Management-perceived relational quality	First PC of numerical answers of management to eight common questions asked to employees and management regarding their relationship
Relational quality: culture	First PC of the differences in numerical answers of employees and management to four common culture-related questions regarding their relationship
Relational quality: policy	First PC of the differences in numerical answers of employees and management to two common policy-related questions regarding their relationship
Relational quality: dispute	First PC of the differences in numerical answers of employees and management to two common dispute-related questions regarding their relationship
Promise keeping	Difference in numerical answers of employees and management to a common question regarding promise keeping between the two
Mutual trust	Difference in numerical answers of employees and management to a common question regarding mutual trust between the two
Information sharing	Difference in numerical answers of employees and management to a common question regarding information sharing between the two
Joint decision-making	Difference in numerical answers of employees and management to a common question regarding joint decision-making between the two
Return on assets	Earnings before interest and taxes divided by total assets
Profit margin	Earnings before interest and taxes divided by sales revenue
Labor productivity	Earnings before interest and taxes plus payroll divided by payroll
Employee turnover	Log of one plus the number of employees who leave or join
Survival years	Final year reported in the survey panel minus the current year
Sales/Payroll	Sales revenue divided by payroll
COGS/Payroll	Cost of goods sold divided by payroll
Gross profit/Payroll	Gross profit divided by payroll
SG&A/Payroll	Sales, general, and administrative expenses divided by payroll
Establishment size	Log of one plus sales revenue
Employment size	Log of one plus the number of employees
Establishment age	Log of one plus the number of years since foundation
Leverage	Total debt divided by total assets
Capital intensity	Property, plant, and equipment divided by total assets
Intangible investment	Intangible assets divided by total assets
Per-employee wage	Log of one plus payroll divided by the number of employees
Public firm	Equals one if an establishment is listed on KOSDAQ, KOSPI, or KONEX and zero otherwise
Capital expenditure	Change in PP&E between the current and previous calendar years divided by total assets

Variable name	Definition
# Outgoing employees	Log of one plus the number of employees who leave
# Incoming employees	Log of one plus the number of employees who join
# Incoming regular employees	Log of one plus the number of regular employees who join
# Incoming temporary employees	Log of one plus the number of temporary employees who join
# Incoming experienced regular employees	Log of one plus the number of employees who join with relevant work experience
# Incoming inexperienced regular employees	Log of one plus the number of employees who join without relevant work experience
% Outgoing employees	Percent of employees who leave
% Incoming employees	Percent of employees who join
% Incoming regular employees	Percent of regular employees who join
% Incoming temporary employees	Percent of temporary employees who join
% Incoming experienced regular employees	Percent of employees who join with relevant work experience
% Incoming inexperienced regular employees	Percent of employees who join without relevant work experience
Job training for field employees	Equals one if production workers receive job training and zero otherwise
Job training for field supervisors	Equals one if site supervisors receive job training and zero otherwise
Job training for R&D experts	Equals one if technical experts including R&D personnel receive job training and zero otherwise
Labor intensity	Inverse of property, plant, and equipment divided by total assets
Merit pay	Equals one if employees can negotiate the next year's salary based on their performance this year and zero otherwise
Stock option	Equals one if employees receive stock options and zero otherwise
ESOP	Equals one if employee stock ownership plan is in place and zero otherwise
Agreement on wage issues	Equals one if employees and management agree on such issues as wage freeze and zero otherwise
Agreement on working conditions	Equals one if employees and management agree on changes in working conditions (e.g., flexible working hours and job rotation) and zero otherwise
Agreement on job security	Equals one if management agrees with the union to guarantee regular employees' employment and zero otherwise
# Wage negotiations	The number of wage negotiations
$\Delta_e W$	Wage increase rate proposed by employees
$\Delta_m W$	Wage increase rate proposed by management
ΔW^*	Wage increase rate agreed between employees and management
Work to rule	Equals one if employees work to rule for wage negotiation and collective agreement revision in two calendar years and zero otherwise
Strike	Equals one if employees strike for wage negotiation and collective agreement revision in two calendar years and zero otherwise
DIY MSCI ESG KLD	Sum of indicators that equal one if an establishment satisfies each of the MSCI ESG KLD's social criteria observable from WPS and zero otherwise
DIY S&P Global Ratings	Sum of indicators that equal one if an establishment satisfies each of the S&P Global Ratings' social criteria observable from WPS and zero otherwise
DIY Bloomberg	Sum of indicators that equal one if an establishment satisfies each of the Bloomberg's social criteria observable from WPS and zero otherwise
MSCI ESG KLD employee	A subcomponent of MSCI ESG KLD's social score, which reflects labor relations

Labor-Management Relational Capital

Sunwoo Hwang and Biwon Lee

INTERNET APPENDIX

A Workplace Panel Survey (WPS)

The WPS provides a broad range of variables that quantifies the characteristics of establishments that employ 30 or more regular employees from 2005 to 2019. At the time of this writing, the dataset is available up to the latest survey year of 2019. These establishments are selected through stratified random sampling and, once sampled, remain in the panel unless it ceases operations.

Korean Labor Institute (KLI), a government-funded research body, conducts surveys, codes variables using survey responses, and releases updated versions of the WPS every two years. The KLI defines strata based on 12 industries, five regions, and four size groups. Establishments representative of each stratum are randomly selected and contacted for participation. Internet Appendix Table IA1 provides a list of the 12 industries, which later consolidates into ten industries in 2015. The five regions are Seoul, Gyeonggi/Incheon, Gangwon/Chungcheong, Jeolla/Jeju, and Gyeongsang, which encompass nine provinces and eight special cities in Korea. The four size groups are determined based on employment figures: 30-99, 100-299, 300-999, and 1000 or more regular employees if sampled between 2005 and 2013, and 30-99, 100-299, 300-499, or 500 or more regular employees if sampled between 2015 and 2019. Version 1.71 of the WPS User's Guide (available in Korean) provides further details about the survey and data construction. The KLI excludes agricultural, forestry, fishery, and mining industries. We further exclude public-sector establishments and sole proprietors to focus specifically on corporations.

Financial statement figures are collected at the firm level and converted into establishment-level figures for multi-unit establishments, which refer to establishments belonging to a firm that has multiple establishments. To facilitate this conversion, the WPS offers a variable called "transr." This variable represents the ratio of sales for a specific multi-unit establishment to the total sales of the firm to which the establishment belongs. In cases where this ratio is unavailable, the variable "transr" takes on the inverse of the total number of multi-unit establishments that comprise the parent firm. By utilizing this variable, financial statement figures are adjusted and attributed to the respective establishment-level units within multi-unit firms.

In every analysis, observations are weighted by the inverse of their probability of being sampled for inclusion in the panel. This weighting procedure accounts for the fact that observations represent varying numbers of establishments. For instance, a small establishment employing 50 individuals may represent 200 establishments within the same industry, region, and size group, while a large establishment employing 500 individuals may only represent two establishments.

Within a regression framework, the probability weight serves to correct each establishment's contribution to point estimates and standard errors. Consider a linear regression model in matrix form, $y = X\beta + u$, which yields an ordinary least squares estimator for β, $\hat{\beta} = (X'X)^{-1}X'y$. To implement the weighting-based correction, we multiply each row of X and y by the square root of the corresponding weight, denoted as $\sqrt{w_i}$, where w_i is the number of establishments that establishment i represents. The weight assigned to an establishment determines its impact on the mean and residual sum of squares within the variance-covariance matrix. An illustration of how STATA implements this correction and derives coefficients and standard errors using survey data and weights can be found in Dupraz (2013). Lastly, the KLI account for the likelihood of establishment survival and non-responses in subsequent surveys in computing the probability weights. This adjustment ensures the weights accurately reflect the representation of establishments in the overall population.

Figure IA1: Social scores of employee relations and relational quality

This figure depicts the scatterplots that exhibit the correlations between the social scores of employee relations provided by MSCI ESG KLD and relational quality. The left (or right) panel features *employee-perceived (or management-perceived)* relational quality in the x-axis. *Employee-perceived (or management-perceived) relational quality* are calculated as the first principal component of the numerical answers of employees (or management) to a set of eight common questions regarding the relations between employees and management. The survey questions and choices are detailed in Table 1. The social scores of employee relations from MSCI ESG KLD are available from 2011 to 2019. The relational quality data is from Korea Labor Institute (KLI)'s Workplace Panel Survey, covering the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Strata are defined by industry, region, and size for 2005-2013 and by industry and size for 2015-2019.

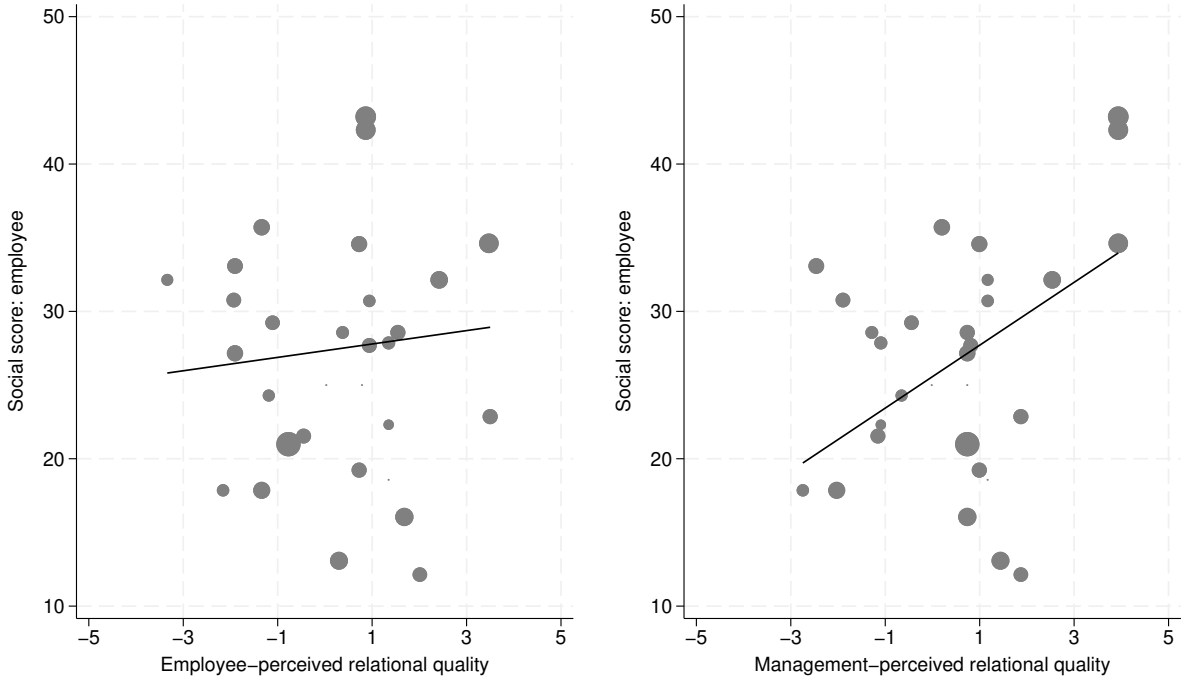
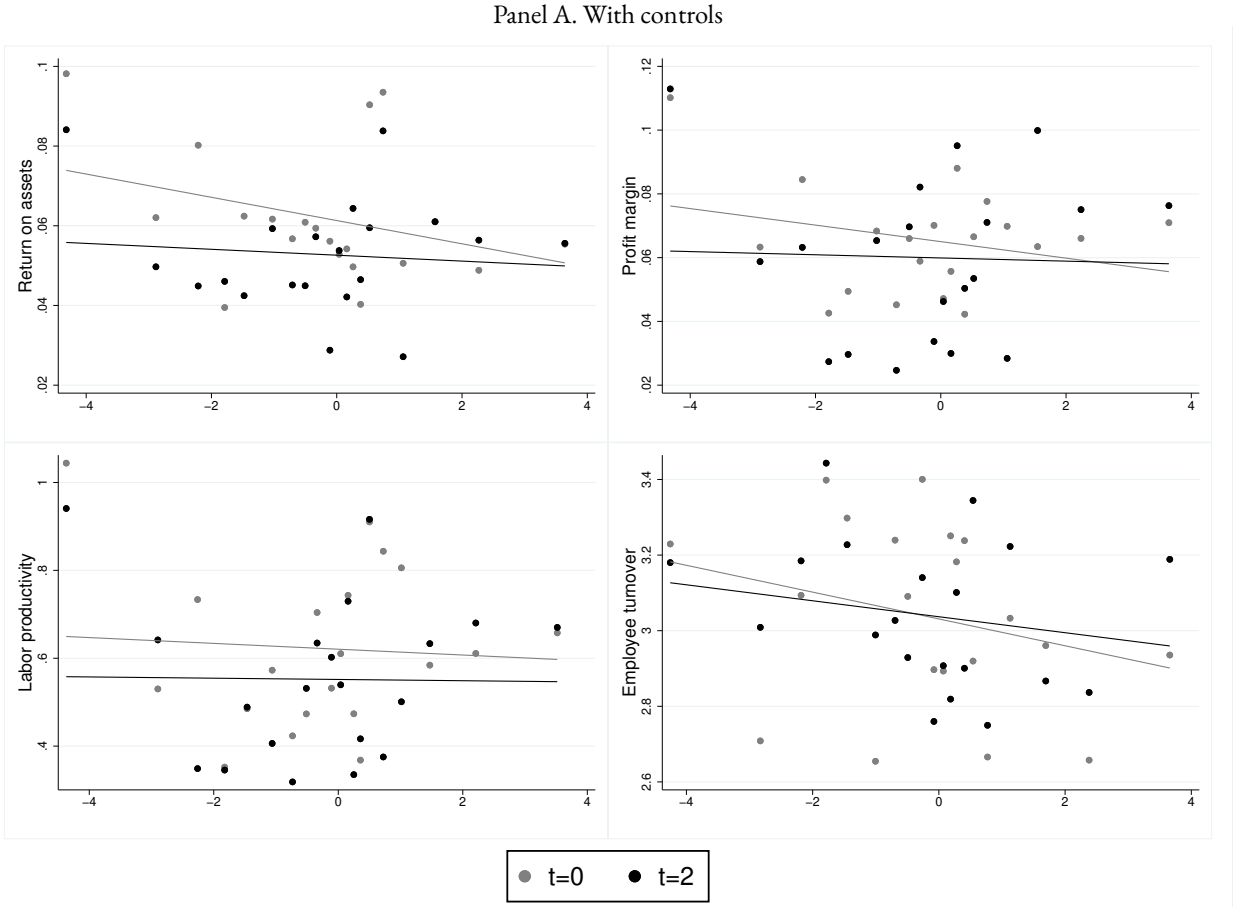


Figure IA2: Relational quality and establishment outcomes (continued)

This figure displays binned scatterplots that compare *relational quality* on the x-axis with contemporary establishment outcomes (shown in gray) and following survey-year establishment outcomes (shown in black) on the y-axis. Panel A includes control variables and excludes stratum-year fixed effects in estimating the relationships depicted by 20 dots and a fitted line. Panel B, on the other hand, excludes control variables and includes stratum-year fixed effects. *Relational quality* is defined in Table 5. The establishment outcomes considered in the subpanels arranged from the top-left to bottom-right corners include return on assets, profit margin, labor productivity, and employee turnover. These variables are defined in Table 5. Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI.

Panel A. With controls



Panel B. With fixed effects

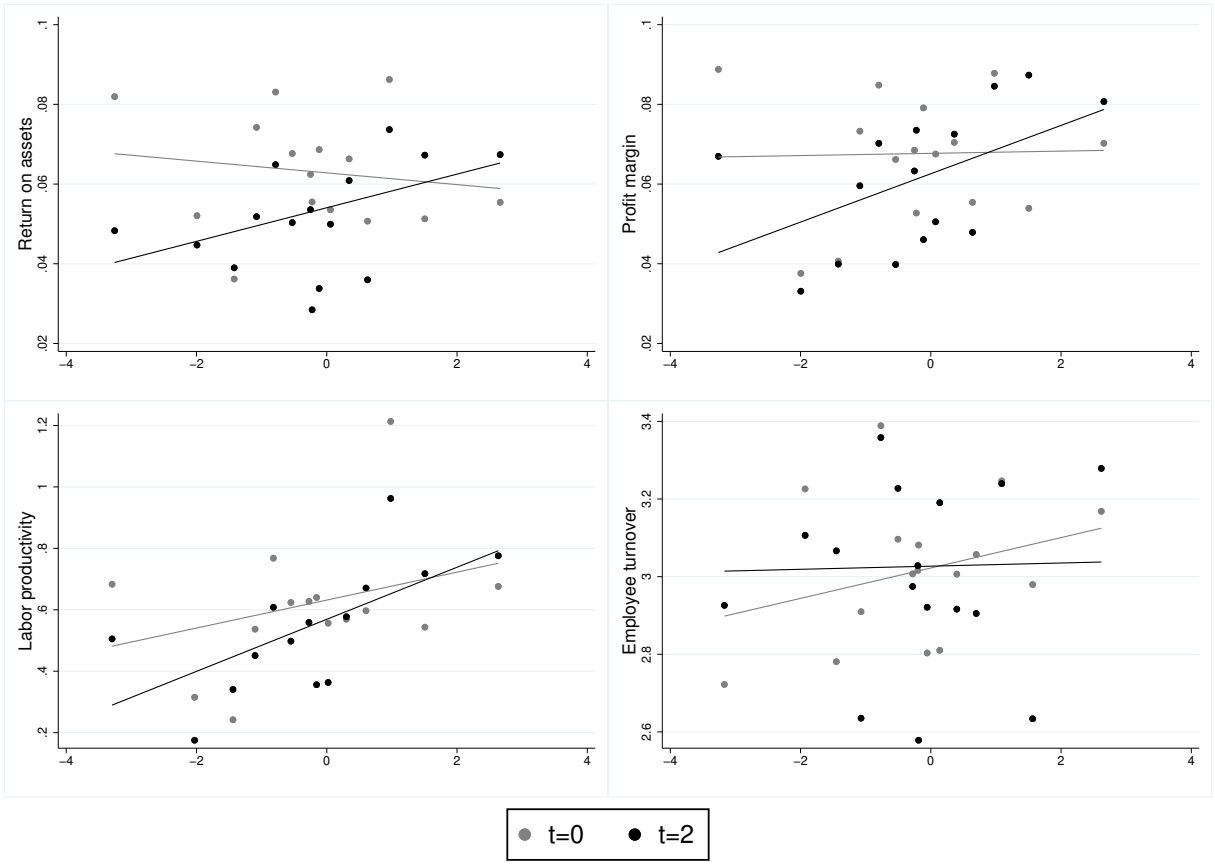


Table IA1: Industry classification

This table presents 12 industries used by the Korea Labor Institute (KLI) to define strata for establishments sampled during the period of 2005-2013 in panel A. In Panel B, 10 industries are listed for establishments sampled during the period of 2015-2019. The last column provides the two-digit industry codes based on the 9^{th} Korean Standard Industrial Classifications, which correspond to each of the 12 and 10 industries defined by the KLI.

Panel A. 12 industries

	Name	Two-digit codes
Manufacturing	Light	10-18, 32, 33
	Chemical	19-23
	Metal, automobile, and transport	24, 25, 29-31
	Electrical, electronics, and precision	26-28
Construction		41, 42
Service	Personal	45-27, 55-56
	Distribution	49-52
	Communications	61
	Finance and insurance	64-66
	Other business	68-75, 39, 58, 62, 63
	Social	37-38, 59, 60, 84, 85, 86-87, 90-91, 94-96
Electricity, gas, and water supply		35, 36

Panel B. 10 industries

	Name	Two-digit codes
Manufacturing	Light	10-18, 32, 33
	Chemical	19-23
		24, 25, 29-31
	Electrical, electronics, and precision	26-28
Non-manufacturing	Construction	41, 42
	Electricity, gas, and water supply	35, 36
	Personal services	37-39, 45-47, 55, 56, 59, 60, 90-98
	Distribution services	49-52, 61
	Business services	58, 62, 63, 64-75
	Social services	84-87, 99

Table IA2: Summary statistics

This table reports summary statistics of establishment characteristics. The data is described in Figure 1 and covers the years 2005 to 2019. All variables are defined in Table A1 and winsorized at the 1% level.

Variable	N	Mean	Median	S.D.	25^{th} pct	75^{th} pct
Relational quality	1673	-0.278	-0.019	1.789	-1.232	0.514
Employee-perceived relational quality	1673	-0.254	-0.167	2.050	-1.572	1.332
Management-perceived relational quality	1673	0.048	0.379	2.011	-1.474	1.170
Relational quality: culture	1673	-0.239	0.182	1.641	-1.068	0.224
Relational quality: policy	1673	-0.096	0.234	1.099	-0.902	0.234
Relational quality: dispute	1673	-0.104	-0.030	1.252	-0.745	-0.030
Promise keeping	1673	-0.166	0.000	0.786	-1.000	0.000
Mutual trust	1673	-0.137	0.000	0.756	-1.000	0.000
Information sharing	1673	-0.235	0.000	0.860	-1.000	0.000
Joint decision making	1673	-0.152	0.000	0.839	-1.000	0.000
Return on assets	1673	0.063	0.054	0.088	0.022	0.105
Profit margin	1673	0.067	0.057	0.119	0.020	0.096
Labor productivity	1673	0.638	0.307	1.363	0.076	0.805
Employee turnover	1673	3.102	3.219	1.554	1.946	4.205
Survival years	1365	6.522	6.000	3.411	4.000	8.000
Sales/Payroll	1673	9.520	6.809	9.520	2.829	12.458
COGS/Payroll	1649	7.590	5.008	8.271	1.936	10.346
Gross profit/Payroll	1649	1.838	1.162	2.044	0.460	2.488
SG&A/Payroll	1668	1.330	0.875	1.363	0.408	1.802
# Outgoing employees	1673	2.482	2.639	1.488	1.386	3.555
# Incoming employees	1673	2.356	2.398	1.531	1.386	3.466
# Incoming regular employees	1435	2.005	2.079	1.472	0.693	3.091
# Incoming temporary employees	1435	0.823	0.000	1.398	0.000	1.386
# Incoming experienced regular employees	1435	0.861	0.000	1.205	0.000	1.609
# Incoming inexperienced regular employees	1435	1.634	1.609	1.436	0.000	2.773
% Outgoing employees	1673	0.116	0.081	0.127	0.032	0.158
% Incoming employees	1673	0.114	0.070	0.149	0.024	0.157
% Incoming regular employees	1435	0.089	0.048	0.121	0.010	0.121
% Incoming temporary employees	1435	0.047	0.000	0.281	0.000	0.017
% Incoming experienced regular employees	1435	0.025	0.000	0.053	0.000	0.028
% Incoming inexperienced regular employees	1435	0.063	0.031	0.100	0.000	0.081

Variable	N	Mean	Median	S.D.	25^{th} pct	75^{th} pct
Establishment size	1673	10.800	10.629	1.618	9.631	11.868
Employment size	1673	5.049	4.883	0.999	4.263	5.727
Establishment age	1673	3.255	3.258	0.572	2.890	3.714
Leverage	1673	0.515	0.484	0.278	0.328	0.650
Capital intensity	1673	0.408	0.397	0.230	0.242	0.561
Intangible investment	1673	0.023	0.004	0.059	0.000	0.018
Per-employee wage	1673	3.937	3.964	1.100	3.358	4.389
Job traing for field employees	952	0.480	0.000	0.500	0.000	1.000
Job training for field supervisors	952	0.404	0.000	0.491	0.000	1.000
Job traing for R&D experts	952	0.405	0.000	0.491	0.000	1.000
Labor intensity	1673	8.673	2.521	41.357	1.781	4.136
Debt to assets	1673	0.515	0.484	0.278	0.328	0.650
Public firm	664	0.335	0.000	0.472	0.000	1.000
Capital expenditure	1673	-0.001	0.000	0.082	-0.021	0.020
Merit pay	1009	0.248	0.000	0.432	0.000	0.000
Stock option	1009	0.025	0.000	0.157	0.000	0.000
ESOP	1009	0.141	0.000	0.348	0.000	0.000
Agreement on wage issues	1380	0.124	0.000	0.330	0.000	0.000
Agreement on working conditions	1380	0.080	0.000	0.271	0.000	0.000
Agreement on job security	1491	0.184	0.000	0.388	0.000	0.000
# Wage negotiations	1518	11.345	9.000	8.220	6.000	16.000
$\Delta_e W$ - $\Delta_m W$	1498	3.943	3.000	3.939	0.000	6.190
$\Delta_e W$ - ΔW^*	1514	3.063	2.000	3.336	0.000	5.000
ΔW^* - $\Delta_m W$	1506	0.924	0.000	2.414	0.000	2.000
Work to rule	1487	0.076	0.000	0.264	0.000	0.000
Strike	1550	0.055	0.000	0.228	0.000	0.000
DIY MSCI ESG KLD	95	7.023	7.000	1.135	6.000	8.000
DIY S&P Global Ratings	270	5.765	6.000	0.910	5.000	6.000
DIY Bloomberg	95	5.941	6.000	1.279	5.000	7.000
MSCI ESG KLD employee	27	27.487	27.860	8.960	20.990	34.570
Population size = 24,149.879, #Strata = 159						

Table IA3: Robustness to controls and singletons

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in the subsequent survey year. In Panel A, control variables are excluded, while in Panel B singletons are excluded during estimation. The establishment outcomes in columns (1) to (4) represent return on assets, profit margin, labor productivity, and employee retention, respectively. These variables are defined in Table 5. The regressor is *relational quality* as defined in Table 5. Control variables are listed in Table 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Without controls

Dep. Var.	(1) Return on assets$_{t+2}$	(2) Profit margin$_{t+2}$	(3) Labor productivity$_{t+2}$	(4) Employee turnover$_{t+2}$
Relational quality	0.0047*	0.0083***	0.0887***	-0.0261
	(0.003)	(0.003)	(0.031)	(0.041)
Controls	N	N	N	N
Stratum-year FE	Y	Y	Y	Y
# Observations	1745	1745	1745	1745
Adjusted R^2	0.173	0.107	0.229	0.374

Panel B. Without singletons

Dep. Var.	(1) Return on assets$_{t+2}$	(2) Profit margin$_{t+2}$	(3) Labor productivity$_{t+2}$	(4) Employee turnover$_{t+2}$
Relational quality	0.0053**	0.0088***	0.0975***	-0.0652*
	(0.003)	(0.003)	(0.031)	(0.036)
Controls	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y
# Observations	1375	1375	1375	1375
Adjusted R^2	0.212	0.150	0.325	0.449

Table IA4: Cultural dimension constituents and establishment outcomes

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in the subsequent survey year. The establishment outcomes include return on assets (columns (1) to (4)) and profit margin (columns (5) to (8)) in Panel A and labor productivity (columns (1) to (4)) and employee turnover (columns (5) to (8)) in Panel B. These variables are defined in Table 5. The regressors are the differences in numerical responses between employees and management to four culture-related questions: promise-keeping (columns (1) and (5)), mutual trust (columns (2) and (6)), information sharing (columns (3) and (7)), and joint decision-making (columns (4) and (8)). The survey questions and choices are detailed in Table 1. Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Profitability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	Return on assets$_{t+2}$				Profit margin$_{t+2}$			
Culture - promise keeping	0.0114*				0.0173**			
	(0.006)				(0.008)			
Culture - mutual trust		0.0124**				0.0154**		
		(0.005)				(0.007)		
Culture- information sharing			0.0126**				0.0226***	
			(0.006)				(0.007)	
Culture - joint decision-making				0.0123**				0.0206***
				(0.006)				(0.007)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y	Y	Y	Y
# Observations	1673	1673	1673	1673	1673	1673	1673	1673
Adjusted R^2	0.207	0.209	0.211	0.209	0.142	0.140	0.152	0.148

Panel B. Labor productivity and employee turnover

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Labor productivity$_{t+2}$				Employee turnover$_{t+2}$			
Culture - promise keeping	0.2031***				-0.0120			
	(0.077)				(0.078)			
Culture - mutual trust		0.0905				-0.1706**		
		(0.067)				(0.082)		
Culture- information sharing			0.2556***				-0.1138	
			(0.073)				(0.074)	
Culture - consultation on major changes in work condition				0.2146***				-0.1813***
				(0.072)				(0.070)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y	Y	Y	Y
# Observations	1673	1673	1673	1673	1673	1673	1673	1673
Adjusted R^2	0.322	0.314	0.331	0.324	0.448	0.455	0.452	0.456

Table IA5: Robustness to alternative variable definitions

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in the subsequent survey year. Panel A redefines the regressor, and Panels B and C redefine the outcomes. The regressor is *relational quality*, alternatively defined as the difference between *employee-perceived relational quality* and *management-perceived relational quality* in Panel A. The two variables are defined in Table 5. In Panel A, the establishment outcomes in columns (1) to (4) include return on assets, profit margin, labor productivity, and employee turnover, as defined in Table 5. In Panel B, the outcome is labor productivity, calculated using alternative output measures: sales in column (1), cost of goods sold in column (2), gross profit in column (3), and sales, general, and administrative expenses in column (4). In Panel C, the outcome is a scaled version of the retention and hiring variables, which represent the number of outgoing employees, incoming employees, incoming regular employees, incoming temporary employees, incoming inexperienced regular employees, and incoming experienced regular employees as a percentage of total employment in columns (1) to (6). Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Relational quality

Dep. Var.	(1) Return on assets$_{t+2}$	(2) Profit margin$_{t+2}$	(3) Labor productivity$_{t+2}$	(4) Employee turnover$_{t+2}$
Employee-perceived relational quality	0.0045*	0.0076***	0.0837***	-0.0550*
- management-perceived relational quality	(0.002)	(0.003)	(0.027)	(0.033)
Controls	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y
# Observations	1673	1673	1673	1673
Adjusted R^2	0.207	0.144	0.323	0.452

Panel B. Labor productivity

Dep. Var.	(1) (Sales / Payroll)$_{t+2}$	(2) (COGS / Payroll)$_{t+2}$	(3) (Gross profit / Payroll)$_{t+2}$	(4) (SG&A / Payroll)$_{t+2}$
Relational quality	0.1813	-0.0336	0.1003**	0.0355
	(0.165)	(0.123)	(0.041)	(0.026)
Controls	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y
# Observations	1673	1650	1650	1669
Adjusted R^2	0.680	0.687	0.532	0.583

Panel C: Retention and hiring

Dep. Var.	(1) % Outgoing employees$_{t+2}$	(2) % Incoming employees$_{t+2}$	(3) % Incoming regular employees$_{t+2}$	(4) % Incoming temporary employees$_{t+2}$	(5) % Incoming experienced regular employees$_{t+2}$	(6) % Incoming inexperienced regular employees$_{t+2}$
Relational quality	-0.0052	-0.0052	-0.0066*	0.0152**	0.0005	-0.0071**
	(0.003)	(0.003)	(0.004)	(0.008)	(0.001)	(0.003)
Controls	Y	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y	Y
# Observations	1672	1672	1673	1673	1673	1673
Adjusted R^2	0.123	0.175	0.0802	-0.00964	0.155	0.0829

Table IA6: Robustness to alternative employee compensation schemes

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in the subsequent survey year. The regressors are *relational quality* in column (1) and *relational quality*, a mediator variable, and their interaction term in columns (2) to (5). *Relational quality* is defined in Table 5. The mediator is an indicator that takes the value of one if an establishment offers a specific incentive scheme and zero otherwise. In Panel A, the scheme is merit pay, which allows employees to negotiate their next year's salary based on their performance in the current year. In Panels B and C, the schemes are employee stock options and employee stock ownership plan (ESOP), respectively. The establishment outcome is the mediator variable in column (1). In columns (2) to (5), the outcomes include return on assets, profit margin, labor productivity, and employee retention, respectively, as defined in Table 5. Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Merit pay

Dep. Var.	(1) Merit pay$_{t+2}$	(2) Return on assets$_{t+2}$	(3) Profit margin$_{t+2}$	(4) Labor productivity$_{t+2}$	(5) Employee turnover$_{t+2}$
Relational quality	0.0207*	0.0031	0.0040	0.0610	0.0233
	(0.012)	(0.005)	(0.005)	(0.056)	(0.054)
Merit pay		0.0019	0.0208	0.4136*	0.1061
		(0.012)	(0.023)	(0.226)	(0.178)
Relational quality x Merit pay		-0.0113*	0.0035	0.0752	-0.0468
		(0.006)	(0.011)	(0.117)	(0.069)
Constant	0.9106**	0.0753	0.1311	-0.1332	-2.6197**
	(0.385)	(0.085)	(0.173)	(1.655)	(1.149)
Controls	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y
# Observations	860	1009	1009	1009	1009
Adjusted R^2	0.293	0.245	0.157	0.335	0.494

Panel B. Stock option

Dep. Var.	(1) Stock option$_{t+2}$	(2) Return on assets$_{t+2}$	(3) Profit margin$_{t+2}$	(4) Labor productivity$_{t+2}$	(5) Employee turnover$_{t+2}$
Relational quality	0.0058	0.0010	0.0050	0.0798	0.0154
	(0.006)	(0.004)	(0.005)	(0.052)	(0.047)
Stock option		0.0169	0.0479	0.4573	-0.1647
		(0.019)	(0.035)	(0.324)	(0.248)
Relational quality x Stock option		-0.0039	-0.0032	0.0027	-0.0122
		(0.010)	(0.016)	(0.140)	(0.141)
Constant	-0.1083	0.0643	0.1414	0.1151	-2.5977**
	(0.167)	(0.085)	(0.175)	(1.700)	(1.106)
Controls	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y
# Observations	860	1009	1009	1009	1009
Adjusted R^2	0.166	0.240	0.158	0.329	0.493

Panel C. ESOP

Dep. Var.	(1) ESOP$_{t+2}$	(2) Return on assets$_{t+2}$	(3) Profit margin$_{t+2}$	(4) Labor productivity$_{t+2}$	(5) Employee turnover$_{t+2}$
Relational quality	0.0052	0.0010	0.0048	0.0873	0.0079
	(0.010)	(0.005)	(0.005)	(0.057)	(0.052)
ESOP		-0.0342**	-0.0589***	-0.4707	-0.1001
		(0.014)	(0.017)	(0.294)	(0.147)
Relational quality x ESOP		-0.0008	0.0006	-0.0600	0.0531
		(0.009)	(0.012)	(0.129)	(0.084)
Constant	-0.2523	0.0582	0.1311	0.0709	-2.6599**
	(0.212)	(0.084)	(0.174)	(1.690)	(1.116)
Controls	Y	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y	Y
# Observations	860	1009	1009	1009	1009
Adjusted R^2	0.364	0.251	0.172	0.334	0.494

Table IA7: Do-it-yourself social score construction

This table provides a list of attributes that ESG rating agencies claim to incorporate into their ratings, as stated on their respective websites. Columns (1) to (3) represent the attributes of MSCI ESG KLD, S&P Global Ratings, and Bloomberg, respectively, that are sourced from the Korea Labor Institute's Workplace Panel Survey (WPS). Column (4) displays the corresponding codes of the WPS variables associated with each attribute. Column (5) indicates the survey years for which these variables are available.

	(1) MSCI	(2) S&P	(3) Bloomberg	(4) WPS variable codes	(5) Survey years
Labor management					
Equal treatment	Y	Y	Y	dq5002r13	2005-2019
Workforce diversity	Y	Y	Y	dq5003	2005-2019
Employee engagement effort	Y	Y		dq2016, dq4001r10	2005-2019
Health and safety					
Industrial accident	Y	Y	Y	fq5901, fq5902 fq5001, fq5005, fq5009	2005-2013 2015-2019
Human capital development					
Job training	Y	Y	Y	eq1902 eq1007	2005-2013 2015-2019
Product					
Quality management program	Y			dq2020	2011-2019
Privacy and data security	Y				
Responsible investment	Y				
Supply chain					
Social supply chain management	Y		Y	aq3026, aq3029	2007-2019
Community					
Support for local community	Y	Y	Y	aq2909	2007-2013
Customer Engagement					
Customer satisfaction		Y			
Vision and strategy					
Business ethics policy			Y	aq2907	2007-2013

Table IA8: Robustness to complete randomness

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in the subsequent survey year. The estimation employes data from two survey years: 2005 and 2015. The establishment outcomes, considered in columns (1) to (4) and defined in Table 5, are the return on assets, profit margin, labor productivity, and employee retention, respectively. The regressor is *relational quality*, as defined in Tables 5. Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dep. Var.	(1) Return on assets$_{t+2}$	(2) Profit margin$_{t+2}$	(3) Labor productivity$_{t+2}$	(4) Employee turnover$_{t+2}$
Relational quality	0.0046	0.0089	0.0777	-0.1106
	(0.005)	(0.007)	(0.059)	(0.080)
Controls	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y
# Observations	550	550	550	550
Adjusted R^2	0.226	0.157	0.379	0.364

Table IA9: Robustness to respondent effects

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in the subsequent survey year. Panel A (resp. Panel B) focuses on a subsample of establishments, defined by the ratio of unique respondents representing employees to the number of survey years during the sample period that is lower (resp. higher) than the median ratio. The establishment outcomes, considered in columns (1) to (4) and defined in Table 5, are the return on assets, profit margin, labor productivity, and employee retention, respectively. The regressor is *relational quality*, as defined in Tables 5. Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Less frequent respondent replacement

Dep. Var.	(1) Return on assets$_{t+2}$	(2) Profit margin$_{t+2}$	(3) Labor productivity$_{t+2}$	(4) Employee turnover$_{t+2}$
Relational quality	0.0059	0.0092**	0.0992**	-0.0967
	(0.004)	(0.004)	(0.044)	(0.061)
Controls	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y
# Observations	920	920	920	920
Adjusted R^2	0.200	0.135	0.265	0.447

Panel B. More frequent respondent replacement

Dep. Var.	(1) Return on assets$_{t+2}$	(2) Profit margin$_{t+2}$	(3) Labor productivity$_{t+2}$	(4) Employee turnover$_{t+2}$
Relational quality	0.0036	-0.0016	0.0312	0.0005
	(0.006)	(0.005)	(0.063)	(0.050)
Controls	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y
# Observations	753	753	753	753
Adjusted R^2	0.312	0.271	0.459	0.439

Table IA10: Relational quality and longer-run outcomes

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment outcomes in two survey years in Panel A and three survey years in Panel B. A survey year spans two calendar years. The establishment outcomes, considered in columns (1) to (4) and defined in Table 5, are the return on assets, profit margin, labor productivity, and employee retention, respectively. The regressor is *relational quality*, as defined in Tables 5. Control variables are listed in Tables 5 and defined in Table A1. The data is described in Figure 1 and covers the years 2005 to 2019. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Establishment outcomes in two survey years

Dep. Var.	(1) Return on assets$_{t+4}$	(2) Profit margin$_{t+4}$	(3) Labor productivity$_{t+4}$	(4) Employee turnover$_{t+4}$
Relational quality	0.0011	0.0071	0.1096**	0.0354
	(0.003)	(0.005)	(0.048)	(0.049)
Controls	Y	Y	Y	Y
Strata-year FE	Y	Y	Y	Y
# Observations	1152	1152	1152	1152
Adjusted R^2	0.201	0.149	0.326	0.395

Panel B. Establishment outcomes in three survey years

Dep. Var.	(1) Return on assets$_{t+6}$	(2) Profit margin$_{t+6}$	(3) Labor productivity$_{t+6}$	(4) Employee turnover$_{t+6}$
Relational quality	0.0022	0.0047	0.0152	0.0653
	(0.004)	(0.006)	(0.055)	(0.045)
Controls	Y	Y	Y	Y
Stratum-year FE	Y	Y	Y	Y
# Observations	718	718	718	718
Adjusted R^2	0.298	0.237	0.256	0.493

Table IA11: Relational quality and establishment survival

This table reports coefficient estimates from the stratum-year fixed effects model in Equation 1, which predicts establishment survival in subsequent survey years. Establishment survival is measured by the number of calendar years until the last reported survey year. The regressors in columns (1) to (6) are *relational quality*, *employee-perceived relational quality*, *management-perceived relational quality*, *relational quality: culture*, *relational quality: culture*, and *relational quality: culture*, as defined in Table 5. Control variables, listed in Table 5 and defined in Table A1, are included in the regression models. The data is described in Figure 1 and covers the years from 2005 to 2015. To account for the varying representativeness of each observation, the estimation is adjusted using the probability weights provided by the KLI. Robust (White) standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	Survival years $_{t+2}$					
Relational quality	0.1627**					
	(0.079)					
Employee-assessed relational quality		0.0391				
		(0.058)				
Management-assessed relational quality			-0.0949			
			(0.060)			
Relational quality: culture				0.1556*		
				(0.084)		
Relational quality: policy					0.0844	
					(0.110)	
Relational quality: dispute						0.1978**
						(0.096)
Controls	Y	Y	Y	Y	Y	Y
Strata-year FE	Y	Y	Y	Y	Y	Y
# Observations	1660	1660	1660	1660	1660	1660
Adjusted R^2	0.497	0.492	0.494	0.496	0.493	0.496

References

Dupraz, Y. (2013). Using weights in stata. *Paris School of Economics*, 1–6.