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**Boss Quality and Employee Work Intensity:
Evidence from Europe and the United States**

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**Boss Quality and Employee Work Intensity:
Evidence from Europe and the United States**

Abstract

How does boss quality relate to the work intensity of subordinates? Bridging research on the antecedents of work intensity and the consequences of boss quality, we analyze this relationship using data from the 2015 European Working Conditions Survey and longitudinal data from the 2015/2018 American Working Conditions Survey. In cross-sectional, pooled, and panel analyses, we find robust evidence of a negative association between boss quality and employee work intensity. This association is substantially more negative in contexts in which supervisory discretion is likely to be greater—particularly in organizations that are small, in the private sector, and without employee representation.

1. INTRODUCTION

Work intensity or ‘intensive work effort’ is “*the rate of physical and/or mental input to work tasks performed during the working day ... [it] is inversely linked to the porosity of the working day, meaning those gaps between tasks during which the body and mind rests*” (Green 2001: 56). Rather than referring to work duration or ‘extensive work effort,’ work intensity refers to the amount of effort required of an employee per unit of their working time (Kristensen et al. 2004). Persistently high levels of work intensity have long been observed and remain across the globe, including in the major economies of Europe and the U.S. (e.g., Eurofound 2025; Green 2025; Hassard, McCann, & Morris 2009).

Work intensity is an important issue because research suggests that it has implications for employees’ physical and mental health and for the healthcare system. For example, in representative data for Europe, Cottini and Lucifora (2013) show that work intensity is a stronger predictor of reduced mental health and of higher levels of stress, anxiety, and irritability than other risk factors, such as long hours, low job autonomy, or shift work. In more recent data, again representative of Europe, Avgoustaki and Frankort (2019) find that work intensity is by some distance the strongest predictor of increased stress and fatigue, and of decreased job satisfaction. Goh, Pfeffer, and Zenios (2016) highlight the broader implications of work intensity in the U.S.¹ For example, they estimate that the excess amount of U.S. healthcare spending related to work intensity is the highest among the ten workplace stressors they study—about US\$48 billion annually. This estimate is 20% higher than their next-highest spending estimate, which is related to having no health insurance, and it is almost four times the estimated excess healthcare spending related to long working hours. Thus, work intensity is not only a major risk factor for employees’ physical and mental health, but also plausibly has systemic implications by placing a substantial burden on the healthcare system.

Given these ramifications, understanding the drivers of work intensity is a critical scholarly task. While a growing literature in industrial relations uses representative samples to highlight factors such as job design and employment practices as predictors of intensive work effort (e.g., Green et al. 2022), it has paid limited attention to the role of an employee’s direct line manager, which we call their ‘supervisor’ or ‘boss’ hereafter. This omission matters because research in personnel economics consistently shows that good bosses improve outcomes such as productivity and retention (e.g., Lazear, Shaw, & Stanton 2015). Yet, that research has rarely considered work intensity as a meaningful correlate of boss quality—defined here as a supervisor’s “interpersonal skills in relations with their subordinates” (Hoffman & Tadelis 2021: 244).

Thus, the purpose of this article is to bridge these distinct strands of literature—on the antecedents of work intensity and the consequences of boss quality—to generate evidence on two fundamental, unresolved questions. First, how does supervisory quality relate to the work intensity of subordinates? Specifically, are employees with good bosses motivated to work more intensively, so that boss quality and work intensity are positively associated? Or do good bosses shield their subordinates from excessive work demands, implying a negative, rather than a positive, association between boss quality and work intensity? Second, does the magnitude of the relationship between boss quality and work intensity vary by characteristics of employees, tasks, and organizational settings?

We answer these questions using data from two distinct sources: (1) the 2015 wave of the European Working Conditions Survey (EWCS) and (2) the 2015 and 2018 waves of the American Working Conditions Survey (AWCS). These datasets are representative of the working populations in Europe and the U.S., so that—with appropriate survey weights—our findings generalize to these respective populations. We first generate cross-sectional and pooled estimates of the baseline relationship between boss quality and employee work intensity. For both Europe

and the U.S., we apply Oster's (2019) bounds analysis to assess the robustness of the estimates to potential bias from unobserved confounding. Next, we exploit the panel structure of the AWCS, as well as information on whether employees changed employer and/or supervisor between waves, to obtain a range of within-employee estimates of the boss quality association with work intensity. In the AWCS, we also generate conditional-change and lagged dependent-variable estimates. Finally, we return to the much larger EWCS sample to investigate how the relation of boss quality to work intensity varies by employee, task, and organizational characteristics.

We find robust evidence of a negative association between boss quality and employee work intensity for both Europe and the U.S.: The higher the quality of the boss, the lower the work intensity of their subordinates. For Europe, we also find that the negative boss-quality association with work intensity is more pronounced in organizations that are small, in the private sector, and without employee representation, where supervisory discretion is likely to be greater. Taken together, our evidence informs scholarly and policy debates on work intensity by establishing supervisory quality as a robust predictor whose relevance varies systematically with organizational context.

2. RELATED LITERATURE

2.1 Predictors of Work Intensity

The sources of work intensity have been the subject of extensive research. Especially in industrial relations, this research has primarily aimed to explain why work has intensified over time and in so many countries—i.e., it has focused on the drivers of widespread work intensification (e.g., Adăscăliței, Heyes, & Mendonça 2022; Burchell, Ladipo, & Wilkinson 2002; Green 2001, 2004; Green & McIntosh 2001; Green et al. 2022; Hassard et al. 2009; Kalleberg 2011). By contrast, much less attention has been paid to why some employees experience higher work intensity than others do. The estimates that come closest to answering

this question are found in recent work-intensity equations based on representative data for Europe (Adăscăliței et al. 2022) and Britain (Felstead et al. 2019; Green et al. 2022). These studies offer consistent inventories of common predictors of work intensity, revealing that a range of individual-, task-, and organization-level factors—such as gender, age, and contractual basis; computer use, discretion, and incentives; and employer size and sector—help account for variation in work intensity across workers. Adăscăliței et al. (2022) also highlight cross-national differences in economic and institutional factors. However, one potential predictor, namely, an employee’s supervisor or boss, appears to be largely absent from this literature. A related body of research on job strain does consider the role of supervisors, yet it has primarily cast them as sources of social support—buffering the negative consequences of work intensity for employee well-being—rather than as contributors to work intensity itself (Karasek & Theorell 1990).²

2.2 Boss Quality as a Predictor

Recent research in personnel economics increasingly examines the impact of bosses on employee outcomes, often using single firms or single settings as cases (Benson & Shaw 2025; Hoffman & Stanton 2025; Roberts & Shaw 2022). This literature convincingly shows that supervisors matter. For example, Lazear et al. (2015) use data from one service company to show a positive overall impact of supervisory quality on output and the retention of subordinates. Other studies suggest how specific characteristics of supervisors affect employee outcomes. For example, Artz, Goodall, and Oswald (2017) use data for the U.S. and Britain to examine the relation of supervisors’ technical competence to subordinate job satisfaction. Relatedly, in a sample of major U.K. and Swedish universities, Bäker and Goodall (2020) study the relationship between the research strength of Department Chairs and the job satisfaction and quit intentions of academics under their supervision. As another example, Adhvaryu, Nyshadam, and Tamayo (2023) use data from a garment export firm to relate managerial attention and control to

productivity. Closer to our focus on boss quality as an indicator of interpersonal skills, Artz, Goodall, and Oswald (2020), Bäker, Goodall, and Serra-Sastre (2026), and Hoffman and Tadelis (2021) show—in representative European data, and in data for the U.K.’s National Health Service and for one high-tech firm, respectively—that bosses’ social skills in relations with their subordinates predict higher levels of job satisfaction and employee retention.

Despite growing attention to boss quality in personnel economics, this literature emphasizes productivity, retention, and to a lesser extent job satisfaction, while underemphasizing how supervisors shape the demands of work as a more-proximal outcome. Yet, the intensity of work may be a key pathway through which managerial discretion influences employees’ experiences in the workplace. Overall, while the work-intensity literature in industrial relations has tended to overlook supervisors as a distinct predictor of work intensity, the emerging economics literature on bosses has tended to overlook work intensity as a meaningful correlate of boss quality. As a result, we know little about the boss-quality association with employee work intensity.

Addressing this question is important because prior research implies contrasting expectations, each consistent with different strands of existing evidence in the personnel-economics literature on bosses. Some theoretical arguments would suggest that higher boss quality—characterized by strong interpersonal skills, such as being respectful and supportive of subordinates—may predict higher work intensity because it elicits reciprocation from employees. In contrast, if high-quality supervisors shield employees from excessive demands, then higher boss quality may actually predict a lower rather than a higher level of work intensity.

Arguments suggesting that boss quality has a positive association with employee work intensity derive from social exchange theory (Akerlof 1982; Blau 1964). This theory implies that higher boss quality may elicit reciprocating responses from employees, which could take the

form of greater discretionary effort, such as working more intensively to help supervisors meet organizational objectives (Cropanzano et al. 2017; Kurtessis et al. 2017). Under this view, employees voluntarily intensify their effort, even in the absence of formal incentives, in response to the perception that their boss treats them well. As one dimension of work effort, work intensity can predict increased job performance (Van Iddekinge et al. 2023), so a positive relationship between boss quality and work intensity would be consistent with prior evidence relating good bosses to higher employee productivity (e.g., Adhvaryu et al. 2023; Lazear et al. 2015).

However, the literature also offers accounts implying the opposite, namely, a negative association between supervisory quality and employee work intensity. Underlying this possibility is the argument that high-quality bosses shield their subordinates from organizational pressures. This can occur because such supervisors may be more effective at limiting job demands than lower-quality bosses (Bakker & Demerouti 2007), but also because they may refrain from exercising direct control over the intensity of their subordinates' work (e.g., Deery, Iverson, & Walsh 2010). Substantial evidence has linked higher work intensity to lower well-being and job satisfaction (e.g., Avgoustaki & Frankort 2019; Goh et al. 2016; Lopes, Lagoa, & Calapez 2014), which in turn are known predictors of quit intentions and actual quits (Böckerman & Ilmakunnas 2009; Clark 2001; Green 2010). Thus, a negative relationship between boss quality and work intensity would be consistent with other prior evidence relating good bosses to higher job satisfaction (Artz et al. 2017; Bäker & Goodall 2020), lower turnover intentions (Bäker et al. 2026), and higher employee retention (Hoffman & Tadelis 2021).

2.3 Heterogeneity in the Boss-Quality Association with Work Intensity

A related and equally significant question concerns the contexts in which boss quality may be a stronger or weaker predictor of employee work intensity (e.g., Benson & Shaw 2025; Hoffman & Stanton 2025). We argue that the extent to which boss quality is related to work

intensity should depend on the degree to which employees are exposed to supervisory discretion. Such exposure may vary for several reasons. In some cases, employees may have limited discretion as part of their job design, such that supervisors retain substantial authority over the work of their subordinates, including task allocation, performance expectations, or the pace of their work. In other cases, employees may be particularly dependent on supervisory discretion because they lack alternative sources of protection or bargaining power, such as the presence of unions or a strong HR department. Finally, employees may themselves grant supervisors greater discretion, for example, by relying on them for guidance or career advancement.

Which kinds of employee, task, or organizational characteristics are potential determinants of how exposed employees may be to the discretion of their supervisors? At the employee level, women tend to be subject to higher expectations for compliance and helpfulness than men (e.g., Babcock et al. 2017); younger employees often face greater career concerns and typically possess less bargaining power (e.g., Gibbons & Murphy 1992); blue-collar workers may be more exposed to direct supervision and task monitoring than white-collar ones (e.g., Osterman 1994); and workers in precarious, insecure employment are more reliant on supervisory discretion and goodwill (e.g., Kalleberg 2009). In terms of task characteristics, repetitive, monotonous, or simple tasks may subject employees to more supervisory oversight, while employees without discretion over how or when to perform their tasks may also be more dependent on their supervisors (e.g., Ortega 2009; Prendergast 2002).

In terms of organizational characteristics, studies in industrial relations and human resource management imply the potential importance of organizational size, private-sector status, and the presence or absence of employee representation (e.g., Gallie 2007; Sisson 1993; Wilkinson 1999). In small firms, supervisors typically have more-direct influence over day-to-day work (e.g., Edwards & Ram 2019), while private-sector firms, compared to public-sector organizations,

may emphasize performance more strongly, intensifying the role of supervisory expectations.

Finally, the absence of employee representation such as a union or works council limits collective voice, which can weaken checks on supervisory demands and increase employees' sensitivity to boss quality (e.g., Dietz, Wilkinson, & Redman 2010).

We expect that greater exposure to supervisory discretion stemming from employee, task, or organizational dimensions such as the ones above strengthens the boss-quality association with employee work intensity. If the baseline association between supervisory quality and work intensity is positive, then we expect this association to be more positive the more an employee is exposed to supervisory discretion. If instead the baseline association is negative, then we expect it to be more negative the more an employee is exposed to supervisory discretion.

3. DATA AND METHODS

3.1 Data and Samples

We analyze two datasets that contain information on bosses and work intensity and that are statistically representative of their chosen populations: The EWCS for 2015 and the AWCS for 2015 and 2018. Although other, more-recent waves of the EWCS are available, we deliberately rely on the 2015 wave to align the timing of the European and U.S. analyses. This choice is particularly appropriate because the survey instrument used by the AWCS was closely harmonized with that used by the EWCS 2015 and fielded in the same year, explicitly to enable comparisons of working conditions between Europe and the U.S. (see Maestas et al. 2017). Such temporal alignment, by design, eliminates period effects arising from subsequent regulatory and macroeconomic changes, so it ensures comparability across the two institutional contexts.

The EWCS 2015 is a stratified random sample of some 44,000 European workers across 35 European countries—the EU-27, Albania, Montenegro, North Macedonia, Norway, Serbia, Switzerland, Turkey, and the United Kingdom. A subset of some 35,600 workers qualified for

our study because they were working as an employee. The EWCS contains information on work effort and employees' bosses, alongside numerous relevant covariates covering employee, task, and organizational characteristics. For this reason, it has been used in recent studies of work intensity (e.g., Adăscăliței et al. 2022; Avgoustaki & Frankort 2019) and boss quality (e.g., Artz et al. 2020).

The AWCS 2015/2018 was fielded on the RAND American Life Panel in 2015 and 2018, and is nationally representative. Both waves of the AWCS were designed to cover virtually the same ground as the EWCS 2015 and they have been used in recent studies of working conditions in the U.S. (e.g., Fujishiro, Ahonen, & Winkler 2021; Garro-Marín, Thakral, & Tô 2025; Maestas et al. 2023; Männasoo 2022). The 2015 survey sampled some 2,100 workers, of which some 1,800 were working as employees, while the 2018 survey sampled some 1,600 workers, of which some 1,400 were employees. Importantly, the 2018 survey targeted only respondents to the 2015 survey. Thus, the AWCS not just offers an opportunity for a replication of the estimates for Europe in a different geographical context, but it also allows us to exploit the panel nature of the data to address some specific issues related to unobserved heterogeneity.

Both in the EWCS and the AWCS, the questions regarding boss quality and work intensity generally appear in separate parts of the survey, which reduces concerns of common-method bias (Spector 2006). Also, to minimize mere order effects, the order of the questions within survey sections was randomized by the interviewer (EWCS) or permuted in the online survey (AWCS). Both the EWCS and AWCS provide survey weights, which we apply throughout the analyses. We use cross-sectional weights, except when we treat the AWCS data as a panel, in which case we use longitudinal weights. The survey weights adjust for sampling design and non-response, allowing us to obtain unbiased estimates representative of the broader working populations in Europe (EWCS) and the U.S. (AWCS). Sample sizes vary across the estimates depending on the

availability of data for the specific variables included in different model specifications.

3.2 Measuring Work Intensity and Boss Quality

3.2.1 Work Intensity

Work intensity has been measured in various ways in the literature (Green et al. 2022). Rather than rely on individual questions regarding, for example, the frequency with which an employee works to tight deadlines, we calculate a more-comprehensive work-intensity index using a set of three items, all of which have extensively been used to capture work intensity (e.g., Adăscăliței et al. 2022; Avgoustaki & Frankort 2019, 2023; Green et al. 2022; Green et al. 2024; Green & McIntosh 2001; Lopes et al. 2014). The first two are measured on a 7-point scale anchored by ‘Never’ and ‘All of the time’ and capture answers to ‘*Does your job involve... (A) work(ing) at very high speed, (B) work(ing) to tight deadlines.*’ The EWCS and AWCS measure these two items in a similar way. The third, measured on a 5-point scale anchored by ‘Always’ and ‘Never,’ captures evaluations of the statements ‘*You have enough time to get the job done*’ (EWCS) or ‘*Enough time to finish work*’ (AWCS).

In each of the two Surveys, the three items are positively correlated and statistically form one common component (see Appendix Table A1). Thus, in both datasets we combine them into one formative index (e.g., Green et al. 2022). To accommodate the difference between the measurement scales, we first standardize the numerical answers to each of the questions and then calculate the measure of *Work intensity* as the average of the resulting *z*-scores.³ Appendix Figure A1 shows the distributions of the work-intensity variables in the two datasets.

3.2.2 Boss Quality

To elicit measures of boss quality, we adopt the approach taken in recent studies that use upward evaluations by workers to evaluate the people-management skills of supervisors (e.g., Artz et al. 2020; Bäker et al. 2026; Haeckl & Rege 2025; Hoffman & Tadelis 2021). Specifically,

both the EWCS and AWCS ask employees for their evaluation of seven characteristics of their boss. The wording and measurement scales of the questions differ between the two Surveys, yet the AWCS closely follows the spirit of the questions in the EWCS.

In one question, the EWCS elicits responses to the following six statements, on a 5-point scale anchored by ‘Strongly disagree’ and ‘Strongly agree’: ‘*Your immediate boss... (A) respects you as a person, (B) gives you praise and recognition when you do a good job, (C) is successful in getting people to work together, (D) is helpful in getting the job done, (E) provides useful feedback on your work, (F) encourages and supports your development.*’ Elsewhere, it also elicits a response to a seventh statement—‘*Your manager helps and supports you*’—on a 5-point scale anchored by ‘Never’ and ‘Always.’⁴ These seven items strongly load onto one common factor (see Appendix Table A1), so we use them to form one composite, reflective index ($\alpha = .89$). We align with Artz et al. (2020) and measure *Boss quality* as the sum of an employee’s answers to the seven questions, generating an ordinal measure running from 7 (worst boss) to 35 (best boss).

The AWCS elicits responses to the following seven statements on a binary agree/disagree scale, all in one place: ‘*Your immediate boss... (1) trusts you, (2) respects you, (3) gives praise/recognition, (4) gets people to work together, (5) is helpful, (6) provides useful feedback, (7) encourages & supports your development.*’ These seven items also strongly load onto one factor (see Appendix Table A1), so here we again mirror the approach in Artz et al. (2020) by measuring *Boss quality* as the sum of an employee’s answers across the seven questions ($\alpha = .88$).⁵ This generates an ordinal measure running from 0 (worst boss) to 7 (best boss).⁶

Appendix Figure A2 shows the distributions of the boss-quality variables in the two datasets. Consistent with the data presented in Artz et al. (2020), Bäker et al. (2026), and Hoffman and Tadelis (2021), the boss-quality variables are skewed to the left, indicating that good bosses are more common than bad ones, both in the European and the U.S. data.

3.3 Empirical Strategy

We use the cross-sectional data from the EWCS 2015 and the longitudinal data from the AWCS 2015/2018 to examine the relationship between boss quality and employee work intensity. Our empirical analysis proceeds in four parts, the first three of which focus on establishing estimates of the baseline boss-quality association with employee work intensity. The fourth step examines whether and how the relation of boss quality to work intensity varies by employee, task, and organizational characteristics.

3.3.1 Step 1: Cross-Sectional and Pooled Estimates

We begin with a cross-sectional analysis in the EWCS, by estimating the following model using OLS with heteroskedasticity-robust standard errors clustered by NUTS2 region:⁷

$$(1) \quad WI_i = \alpha + \beta \cdot BQ_i + \mathbf{X}_i\gamma' + \varepsilon_i,$$

where WI_i is the work intensity of employee i , with higher scores indicating more-intense work; BQ_i is the quality of the boss of employee i , with higher scores indicating higher boss quality; and $\mathbf{X}_i$ is a vector of both time-invariant and time-varying controls for employee, task, and organizational characteristics. In this and all subsequent main models, we include as controls only variables that we believe are unlikely to lie on the causal path from boss quality to work intensity. For example, we exclude variables that plausibly operate as mechanisms—such as employees’ perceptions of how fairly work is distributed or of the degree of direct supervisory control over work pace—because conditioning on such ‘post-treatment’ variables could distort the estimated boss-quality association with work intensity. Where we do incorporate these variables, we clearly note our intended focus on analyzing possible mechanisms.

We build up the estimates of equation (1) in three steps, by expanding the set of controls included in $\mathbf{X}_i$. We begin with a rich set of baseline controls and then next add in a large number of HR practices for comparison. This stepwise approach allows us to examine whether and to

what extent the effect of boss quality merely reflects correlated job-quality factors. In the fullest specification we also incorporate a control for how cooperative the interviewer deemed the responding employee to be during the survey interview, captured on a 5-point scale anchored by ‘Very poor’ and ‘Very good.’ This last variable might absorb an employee’s inclination to give generally positive or negative answers, a source of common-method bias which can confound the boss-quality association with work intensity. Appendix Table A2.1 gives all variable definitions and sources for the EWCS.

We then turn to the AWCS data pooled across 2015 and 2018 to estimate the following model with robust standard errors clustered at the employee level:

$$(2) \quad WI_{it} = \alpha + \beta \cdot BQ_{it} + \mathbf{Y}_i \gamma' + \mathbf{Y}_{it} \zeta' + \delta_t + \varepsilon_{it} ,$$

where $\mathbf{Y}_i$ is a vector of time-invariant controls, $\mathbf{Y}_{it}$ is a vector of time-varying controls, and δ_t is a year fixed effect for 2018. We estimate only two variants of equation (2), one excluding measures of HR practices from $\mathbf{Y}_{it}$ and another including them, because the AWCS is self-reported, so it contains no measure of a respondent’s cooperativeness. Appendix Table A2.2 gives all variable definitions and sources for the AWCS. Table 1 shows summary statistics for both datasets.

--- Insert Table 1 about here ---

For equations (1) and (2), we also examine the sensitivity of the estimated β coefficients to omitted-variable bias. Despite the rich set of covariates included in our equations (see Appendix Tables A2.1 and A2.2), a concern in cross-sectional and pooled regressions is that unobserved factors may generate spurious correlations. Individual characteristics such as personality and organizational characteristics such as culture may affect both supervisory quality and the level of work intensity that employees experience. Likewise, endogenous sorting—either because employees self-select into particular environments or because organizations attract certain types of bosses—may induce a biased association between boss quality and work intensity.

To assess the extent to which our estimates may reflect such omitted-variable bias, we rely on the bounds approach proposed by Oster (2019), building on Altonji, Elder, and Taber (2005).⁸ This approach yields a range of plausible values for boss quality by relating movements in its coefficient and the R^2 as controls are added to assumptions about the strength of unobserved selection, thereby yielding a range of plausible values for the true effect once omitted-variable bias is taken into account. The method requires (i) an assumption about the degree of selection on unobservables relative to observables, denoted δ , and (ii) a value for the maximum attainable R^2 , denoted $R_{\max}^2$, that would obtain if all relevant covariates were observed. Following Altonji et al. (2005) and Oster (2019), we set $\delta = 1$, which assumes that selection on unobservables is equal to that on observables. This is a conservative assumption because our equations incorporate many common controls in the boss-quality and work-intensity literatures (e.g., Artz et al. 2017, 2020; Green et al. 2022; Hoffman & Tadelis 2021). In line with Oster’s recommendation, we set $R_{\max}^2 = \min\{1.3\hat{R}^2, 1\}$, where $\hat{R}^2$ is the R^2 from the particular specification under consideration.

Given these assumptions, we compute the bias-adjusted coefficient β^* , which together with our estimated coefficient $\hat{\beta}$ defines Oster’s (2019) ‘identified set’ as $[\hat{\beta}, \beta^*(\delta, R_{\max}^2)]$. This interval provides a transparent indication of the range of values that the coefficient of boss quality could plausibly take if we were able to adequately account for selection on unobservables.

3.3.2 Step 2: Fixed-Effects Estimates

Next, the panel structure of the AWCS data offers direct opportunities to address rather than merely diagnose possible concerns related to unobserved heterogeneity. First, we estimate the following fixed-effects model with robust standard errors clustered at the employee level:

$$(3) \quad WI_{it} = \beta \cdot BQ_{it} + \mathbf{Y}_{it}\boldsymbol{\zeta}' + \alpha_i + \delta_t + \varepsilon_{it} ,$$

where α_i denotes employee fixed effects. Employees observed in only one wave (i.e., singletons) are excluded from the fixed-effects estimation as they do not contribute to identifying within-employee changes over time.⁹ This way, the AWCS sample becomes a balanced two-period panel, which makes the linear fixed-effects specification in equation (3) mathematically equivalent to a first-difference model. When estimated on the full balanced panel, this fixed-effects model rules out stable employee characteristics as confounders. Thus, it also absorbs stable differences in how positive employees' view of the world is, which may correlate positively with reported boss quality and negatively with reported work intensity, and is thus a possible source of common-method bias (Spector 2006). As in step 1, we begin with a specification with baseline controls, and we then add in HR practices for comparison.

Second, the AWCS 2018 includes a yes/no question asking, '*Are you working for the same employer you were working for on [2015_send_date]?*' Responses to this question allow us to estimate equation (3) on the subsample of "remainers"—i.e., employees who remained with the same employer across waves. Doing so addresses a limitation of models with only employee fixed effects—namely, that the observed association between boss quality and work intensity could still reflect stable, unobserved differences across employers (e.g., firm culture) or the static matching of employees to employers based on unobserved traits.

Third, the AWCS 2018 also includes a yes/no question asking, '*Is your boss the same person who supervised you on [2015_send_date]?*' Responses to this question allow us to estimate equation (3) on two yet more-restricted samples, by examining the within-employee, within-employer effect of boss quality both for employees with the same and for ones with a different boss in 2018 compared to 2015. Restricting the sample to employees with the *same boss* further strengthens inference by also controlling for time-invariant characteristics of both the boss and the employee-boss match. In contrast, restricting the sample to employees with a *different*

boss provides a different kind of evidence, as variation in boss quality now reflects actual changes in boss identity. While this does not eliminate the possibility of dynamic matching of employees to bosses, it increases the likelihood that the observed associations between boss quality and work intensity reflect genuine differences in boss quality.

3.3.3 Step 3: Conditional-Change and Lagged Dependent-Variable Estimates

In step 3, we use AWCS data to estimate two complementary specifications that account, respectively, for change in boss-quality over time and for persistence in work intensity. First, we estimate the following conditional-change model with heteroskedasticity-robust standard errors:

$$(4) \quad WI_{i,2018} = \alpha + \beta \cdot (BQ_{i,2018} - BQ_{i,2015}) + \zeta \cdot BQ_{i,2015} + \mathbf{X}_{i,2018}\gamma' + \varepsilon_{i,2018} ,$$

which relates work intensity in 2018 to changes in boss quality between 2015 and 2018 while conditioning on baseline boss quality in 2015. This specification allows us to distinguish the effect of within-employee changes in boss quality from level differences in reported work intensity associated with initial supervisory quality. While this approach does not eliminate time-varying feedback between work intensity and boss quality, it reduces the extent to which level-based reverse causality can explain the boss-quality association with work intensity.

Second, we estimate the following lagged dependent-variable model with heteroskedasticity-robust standard errors:

$$(5) \quad WI_{i,2018} = \alpha + \beta \cdot BQ_{i,2018} + \pi \cdot WI_{i,2015} + \mathbf{X}_{i,2018}\gamma' + \varepsilon_{i,2018} ,$$

which relates work intensity in 2018 to boss quality in 2018 while conditioning on baseline work intensity in 2015. If baseline work intensity contains transitory shocks correlated with subsequent boss quality, then mean reversion can generate a spurious association between boss quality in 2018 and work intensity in 2018. Estimates of equation (5) mitigate this source of bias by conditioning on prior work intensity, which complements the fixed-effects and conditional-

change estimates and ultimately strengthens inference about the association between contemporaneous boss quality and work intensity.

Consistent with steps 1 and 2, we estimate two variants each of equations (4) and (5), one excluding measures of HR practices from $\mathbf{X}_{i,2018}$ and one including them.

3.3.4 Step 4: Estimates of Heterogeneous Boss-Quality Coefficients

Finally, we return to the EWCS and leverage its large sample size to investigate whether and how the association between boss quality and work intensity varies by employee, task, and organizational characteristics.¹⁰ We do this by estimating equation (1) after adding interactions between boss quality and binary employee, task, and organizational characteristics C_i as follows:

$$(6) \quad WI_i = \alpha + \beta \cdot BQ_i + \tau \cdot (BQ_i \cdot C_i) + \mathbf{X}_i\gamma' + \varepsilon_i,$$

where β is now the boss-quality association with work intensity for employees for whom $C_i = 0$, while τ is the difference in the magnitude of this association between employees for whom $C_i = 1$ and those for whom $C_i = 0$. For example, if C_i is employee gender and $C_i = 0$ for men and 1 for women, then the estimate of β (i.e., $\hat{\beta}$) represents the boss-quality association with work intensity for male employees, while the sum of the estimates of β and τ (i.e., $\hat{\beta} + \hat{\tau}$) represents that association for female employees. A t -test of $\hat{\tau}$ allows us to conclude whether the slope of the association differs between subgroups.

Definitions for C_i , the binary characteristics that proxy for an employee's exposure to supervisory discretion, are given in Section 4.4. We separately estimate equation (6) for each of these characteristics, so that each specification includes a single interaction term between boss quality and one characteristic C_i . In each specification, the focal binary variable is among the covariates $\mathbf{X}_i$, so that its main effect is held constant.

4. RESULTS

4.1 Cross-Sectional and Pooled Estimates

Table 2 shows the cross-sectional estimates of equation (1) for Europe.¹¹ Column 1 includes basic controls for employee, task, and organizational characteristics, and reveals a negative and statistically significant relationship between boss quality and work intensity. This negative association is inconsistent with the argument that good bosses elicit reciprocating responses from employees. Instead, it is consistent with the argument that good bosses shield subordinates from organizational pressures.

Column 2 adds in HR practices among the covariates, revealing negligible attenuation in the negative boss-quality coefficient. Thus, the negative relationship between boss quality and work intensity does not operate substantially through correlated job-quality factors, such as differences in the HR practices available to employees who have bosses of different quality. The coefficients on the HR-practice variables show that work intensity is higher in employees subject to rotating tasks, teamwork, piece rates, individual bonuses, and share income. In contrast, work intensity is lower among employees receiving non-monetary benefits and ones with discretion over their work and schedule.

Column 3 further expands the specification by adding a control for the interviewer's opinion on the employee's cooperation during the survey interview. While this control, as expected, enters the equation with a negative and statistically significant coefficient, the boss-quality coefficient remains identical to that in Column 2 in terms of its sign, magnitude, and significance.^{12,13}

--- Insert Table 2 about here ---

For each of the three specifications, Table 2 also shows standardized coefficients for boss quality, which consistently reveal an implied effect size of about one-sixth of a standard deviation of work intensity. For comparison, the difference in work intensity between an individual holding versus not holding a supervisory role themselves is about nine percent of a standard deviation,

while the difference in work intensity between individuals in firms with versus without some form of employee representation is about four percent of a standard deviation. Thus, the standardized boss-quality effect is 70 percent larger than the effect of oneself having supervisory responsibility, and it is as much as four times the effect of employee representation.¹⁴

To examine the impact of omitted variables, Table 2 also follows Oster's (2019) approach by showing identified sets for the boss-quality coefficients for all three specifications. In all cases, the lower and upper bounds of the bounding sets are very close to one another. Moreover, the signs of the bounds are all negative, meaning that zero is not among the values that the boss-quality coefficient could plausibly take if omitted-variable bias were resolved. Thus, bias in the boss-quality estimates from unobservable selection does not appear to be of primary concern.

Next, Table 3 shows the pooled estimates of equation (2) for the U.S. Column 1 includes basic controls and reveals a negative and statistically significant relationship between boss quality and work intensity. This negative association is consistent with the estimates for Europe in Table 2, meaning the boss-quality estimate for the U.S. also resonates with the argument that good bosses shield subordinates from organizational pressures rather than good bosses eliciting reciprocating responses. Once HR practices are added in Column 2, the negative boss-quality coefficient reduces slightly in magnitude, yet it generously remains statistically significant.¹⁵

--- Insert Table 3 about here ---

In terms of effect size, the pooled estimate for the U.S. in Column 2 of Table 3 is somewhat smaller than the cross-sectional estimates for Europe (Table 2), at about ten percent of a standard deviation of work intensity compared to about 16 percent in Europe.¹⁶ For the two boss-quality coefficients, the identified sets due to Oster (2019) reveal lower and upper bounds that are negative and close to one another, meaning bias in the boss-quality estimate from unobservable selection does not appear to be of primary concern in the U.S. data either.

4.2 Fixed-Effects Estimates

Table 4 contains further analyses for the U.S., this time showing estimates of the fixed-effects model in equation (3), thus directly accounting for the confounding effects of stable employee characteristics (e.g., their personality). Throughout this table, we absorb gender, ethnicity, and education through the employee fixed effects, and we apply longitudinal survey weights.¹⁷

--- Insert Table 4 about here ---

Columns 1 and 2 exploit the full balanced panel of employees. Column 1 shows a negative and statistically significant boss-quality coefficient. When adding HR practices in Column 2, the coefficient remains negative and it increases in magnitude. The standardized effect sizes in this table exclusively rely on variation within employees over time because that is the variation the fixed-effects estimator exploits (Mummolo & Peterson 2018). The full specification in Column 2 reveals a within-employee effect size similar to the cross-sectional effect sizes in the EWCS (Table 2): A one standard-deviation increase in an employee's boss quality is associated with one-sixth of a standard deviation decrease in the employee's work intensity.

Column 3 restricts the estimation of equation (3) to employees who remained with the same employer across waves, which rules out the influence of stable employer differences and the static matching of employees to employers. From this column onward, we drop an employee's occupation because within employers, it is almost perfectly collinear with employee fixed effects. We also drop employee tenure because it increases by three years for all remainers. The relationship between boss quality and work intensity is again negative and significant, with an effect size still somewhat larger than that implied by the pooled estimates in Table 3.

In Columns 4 and 5, we further restrict the estimation of equation (3), by separately examining remainers with the same boss in 2015 and 2018, and ones changing their boss between

2015 and 2018. The boss-quality coefficient remains negative and significant in both columns, and the standardized effect sizes remain similar in magnitude, at about one-eighth of a standard deviation of work intensity.

The estimate in Column 5 is noteworthy because the identifying variation is tied exclusively to actual changes in supervisors rather than to evolving perceptions of the same boss. Thus, it shows that the better an employee's new boss compared to their previous boss, the greater the reduction in that employee's work intensity between 2015 and 2018. In a supplementary analysis (see Appendix Table A6), we find no evidence that work intensity in 2015 predicted whether a remainder had a new boss in 2018, which reduces concern about a reverse-causal account in which prior work intensity drives a change in supervisor. However, the supplementary analysis also shows that prior boss quality predicts boss change, indicating that supervisory turnover likely reflects broader organizational processes. Thus, we interpret the estimates in Column 5 of Table 4 as informative about temporal ordering, rather than as necessarily exploiting exogenous variation in supervisor assignment.

4.3 Conditional-Change and Lagged Dependent-Variable Estimates

Table 5 presents estimates of equations (4) and (5), which complement the cross-sectional, pooled, and fixed-effects estimates in Tables 2-4. Columns 1 and 2 show estimates of the conditional-change model in equation (4), one excluding and one including a set of HR practices among the covariates. The coefficient of interest is that of Δ Boss quality, which is negative and statistically significant in both specifications. Thus, with boss quality in 2015 held constant, an improvement in boss quality between survey waves is associated with a lower level of work intensity in 2018. Effect sizes are again in the region of one-eighth of a standard deviation of work intensity.

--- Insert Table 5 about here ---

Columns 3 and 4 show estimates of the lagged dependent-variable model in equation (5), both with and without adjusting for HR practices. Here, the coefficient of interest is that of boss quality in 2018, which is negative and statistically significant in both specifications. Thus, with work intensity in 2015 held constant, higher boss quality in 2018 is associated with lower work intensity in 2018. The magnitude of the coefficient is meaningfully smaller, at about one-twelfth of a standard deviation of work intensity. This is expected because the lagged dependent-variable specification conditions on prior work intensity, so it accounts for persistence and reduces bias from baseline differences and mean reversion.

4.4 Estimates of Heterogeneous Boss-Quality Coefficients

We now return to the EWCS to examine heterogeneity in the association between boss quality and work intensity based on various employee, task, and organizational characteristics. Table 6 gives definitions of the fourteen binary variables capturing characteristics that proxy for an employee's exposure to supervisory discretion.

--- Insert Table 6 about here ---

Table 7 shows the boss-quality coefficients by subgroup, which derive from fourteen estimates of equation (6), using the same covariates as in Column 2 of Table 2. Three inferences from these results are noteworthy. First, the boss-quality association with work intensity is negative and substantial in all the subsamples. We did not flag the significance of the boss-quality coefficients in this table because our focus here is on differences between the subsamples. Nevertheless, the boss-quality coefficients are statistically significant in all the subsamples.

--- Insert Table 7 about here ---

Second, the boss-quality coefficients are, without exception, more negative in the subsamples of employees that we expected to be more exposed to supervisory discretion.¹⁸ Third, these differences are statistically significant in only a subset of cases, however. As for employee

characteristics, boss quality has a stronger negative association with work intensity for women, young employees, blue-collar, and employees fearing they might shortly lose their job. In terms of task characteristics, the association is more negative for employees with longer repetitive tasks and for ones without work discretion or schedule discretion. Finally, as for organizational characteristics, the boss-quality association with work intensity is more negative in smaller and private-sector organizations, and in ones without employee representation.

These inferences assume that the fourteen tests in Table 7 are independent. Ultimately, however, these subgroup analyses represent multiple tests of one and the same expectation—namely, that boss quality plays a stronger role in intensifying work (in the case of bad bosses) or alleviating work intensity (in the case of good bosses) in situations in which employees are likely to be more exposed to the discretion of their supervisors. Such multiple testing elevates the probability of at least one Type-I error among the fourteen tests (Romano, Shaikh, & Wolf 2010), so more-rigid test thresholds may be desirable for drawing reliable inferences. To this end, the last column of Table 7 takes a conservative approach by reporting significance levels after applying a Bonferroni correction. This correction substantially raises the bar for concluding that a subsample difference is statistically significant. For example, to declare a difference between subsamples as significant at $p < .05$, it requires that this difference has a p -value smaller than $.05/14 = .0036$. Table 7 shows that the differences in the boss-quality coefficients depending on organizational characteristics are the most robust—at $p < .05$ for employer size, and at $p < .01$ for sector and for representation.¹⁹ The difference associated with having or not having job insecurity would also still be significant at $p < .1$.

5. DISCUSSION AND CONCLUSION

Joining literatures on the antecedents of employee work intensity and the consequences of boss quality, we used representative data for Europe and the U.S. to examine the relation of boss

quality to work intensity. Across a wide range of approaches—including cross-sectional, pooled, and fixed-effects estimates—our first finding is that boss quality has a robust, negative, and statistically significant relation to employee work intensity both in the European and in the U.S. data. The estimates appear substantial. For example, the European data imply that a one standard-deviation increase in supervisory quality is associated with a decrease in work intensity that is almost twice the difference in work intensity between an individual holding versus not holding a supervisory role themselves. In the U.S. data, the negative association between boss quality and work intensity holds even in within-employee specifications that control for all time-invariant individual characteristics. The same result also persists when further restricting the U.S. sample to employees who remain with the same employer and regardless of whether their boss changed between the survey waves. Overall, the consistency of the estimates across two major economies and across a range of complementary tests provides robust evidence, in representative data, that boss quality and employee work intensity are systematically related.

Our second finding is that the negative relationship between boss quality and work intensity is more pronounced in contexts in which employees are more exposed to supervisory discretion. The strongest and most-robust evidence of such heterogeneity emerges at the organizational level, as the boss-quality association with work intensity is significantly more negative in organizations that are small, in the private sector, and without employee representation, where supervisory discretion is likely to be greater. By contrast, evidence of more-negative associations in certain employee subgroups plausibly more exposed to supervisory discretion—e.g., women, blue-collar workers, employees with low job security, and those lacking autonomy—is weaker and much less robust. These subgroup differences should be interpreted mostly as suggestive rather than confirmatory, as they do not (or only just) survive correction for multiple testing.

Our findings contribute to the literature in three ways. First, we present original and robust evidence of a negative relationship between boss quality and employee work intensity. A rich work-intensity literature in industrial relations has focused on micro-level predictors such as technological and organization change, gender, and form of employment (e.g., Green et al. 2022), as well as macro-level predictors such as national institutions (e.g., Adăscăliței et al. 2022). We complement this line of work by adding the role of the supervisor as a distinct and important predictor of work intensity. We also complement the emerging literature on supervisors in personnel economics, which has studied employee outcomes such as productivity and retention (e.g., Lazear et al. 2015) and job satisfaction (e.g., Artz et al. 2017), by furnishing evidence consistent with the idea that work intensity is also a meaningful outcome of boss quality.

Second, we show that the boss-quality relation to work intensity is strongest in contexts in which supervisory discretion is likely to be greater, and particularly in organizations that are small, in the private sector, and without employee representation. These results, which pertain to Europe, resonate with accounts emphasizing how limited scale and formal structure amplify not only the positive but also the negative influences of management on employees' working conditions (e.g., Edwards & Ram 2019; Gallie 2007; Wilkinson 1999). Specifically, they reinforce arguments and evidence in industrial relations and human resource management suggesting that employees in smaller, less-structured organizations are more exposed to the effects of supervisory discretion (e.g., Bacon & Hoque 2005; Edwards & Ram 2019; Gallie 2007; Prouska et al. 2025; Tsai, Sengupta, & Edwards 2007). Managers in these contexts have a substantially greater role in shaping employees' working conditions. At one extreme, poor supervisory quality may imply a 'bleak house' environment characterized by high work intensity (Sisson 1993). Yet, at the other extreme, high-quality supervision may imply better working conditions than those typically found in larger, more-structured firms (Wilkinson 1999).

Our specific finding of a more-negative boss-quality coefficient in firms without employee representation logically implies that supervisory quality has a weaker association with work intensity in organizations in which employees are represented. Work intensity was historically managed, in part, through institutional mechanisms, such as works councils or trade unions (Green 2025). Our findings suggest a substitution between these traditional institutional mechanisms and the supervisory channel we foreground in this article. Indeed, they are consistent with the idea that, in organizations in which employee representation is less prevalent, work intensity may be managed instead by improving employees' access to support at work (e.g., Kelly & Moen 2020), and particularly to high-quality supervisors as one key source of support.

Third, by combining representative data from two continents with Oster's (2019) bounds analysis, within-employee estimates from panel data, and conditional-change and lagged dependent-variable approaches, we offer robust evidence that generalizes within Europe and the U.S. Our approach retains the common emphasis on representativeness and policy relevance in prior work-intensity research. Yet, it also uses multiple complementary strategies to assuage concerns about internal validity. While none offers a definitive causal test, together these approaches yield credible estimates in representative data, complementing recent studies of supervisors that have mostly relied on cases of single firms or single settings.

An important strength of our analysis is that the estimates speak to working populations totaling well over 400 million workers across Europe and the U.S. We find strongly consistent results across these two contexts, despite differences in terms of labor-market regulations and supervisory education levels, among other things (e.g., Bloom & Van Reenen 2010b). This suggests that the relationship we found is not driven by characteristics unique to a single national or institutional setting. Our focus on Europe and the U.S. reflects the availability of high-quality survey data in these two contexts, including standardized measures of supervisory quality and

work intensity. As suggested by Green (2025), comparable data are substantially more available in Europe and North America than in many African, Asian, or Latin-American countries. We believe our findings may also be relevant beyond the two major economies we examined because the conceptual arguments are not obviously idiosyncratic to a specific geographic context. Nevertheless, the applicability of our findings to other institutional contexts and to other continents remains an open empirical question.

Two caveats are worth emphasizing. First, although our results are strongly suggestive and robust across a broad suite of specifications, we ultimately do not observe exogenous variation in boss quality and therefore cannot assert with full confidence that the observed association between boss quality and work intensity is causal. For example, because boss quality and work intensity are measured in the same time window, instantaneous simultaneity remains possible. Second, it is challenging to examine the underlying mechanisms through which the relation of supervisory quality to work intensity operates, among others, because of the lack of temporal ordering and the limited availability of questions comprehensively capturing potential mechanisms in both surveys. From a supplementary analysis of possible mechanisms, reported in Appendix Tables A9.1 and A9.2, we tentatively infer that boss quality may have its association with work intensity more because employees with good bosses experience a fairer distribution of work, and less because bad bosses exert more direct control over the pace of subordinates' work.²⁰ We leave these issues for future research.

Notwithstanding these caveats, our estimates are consistent with—though not direct evidence of—a world in which boss quality is causal for work intensity. In such a world, the robust patterns we document would suggest a credible path to reducing work intensity—namely, prioritizing supervisors' interpersonal skills in relations with their subordinates, particularly in contexts in which supervisory discretion is likely to be greater.

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TABLE 1. Summary statistics (EWCS 2015, AWCS 2015/2018)

Variable	EWCS 2015				AWCS 2015/2018			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Work intensity	0.040	0.764	-1.217	2.079	0.028	0.769	-1.614	2.086
Boss quality	27.550	6.136	7	35	5.616	2.106	0	7
Female employee	0.506	0.500	0	1	0.570	0.495	0	1
Employee age	42.132	11.642	15	84	48.665	12.008	18	74
Employee tenure	10.152	9.742	0	64	9.580	9.326	0	50
Supervisory responsibility	0.156	0.363	0	1	0.246	0.431	0	1
Fulltime	0.831	0.375	0	1				
Weekly hours worked	38.352	10.391	1	100	39.542	11.190	1	112
Weekly days worked					4.825	0.794	0	7
Physical health	4.059	0.734	1	5	3.576	0.862	1	5
Self-reported skill level	2.147	0.627	1	3	3.192	0.754	1	4
Computer use	3.784	2.441	1	7	5.540	1.970	1	7
Task uncertainty	1.260	0.907	0	3	1.773	0.871	0	3
Short repetitive tasks	0.252	0.434	0	1				
Longer repetitive tasks	0.412	0.492	0	1				
Monotonous tasks	0.472	0.499	0	1	0.591	0.492	0	1
Complex tasks	0.636	0.481	0	1	0.722	0.448	0	1
Employees are represented	0.507	0.500	0	1				
Union member					0.176	0.381	0	1
Training	0.972	1.028	0	4	1.965	1.352	0	4
Task rotation	0.528	0.499	0	1				
Teamwork	0.631	0.482	0	1	0.670	0.470	0	1
Piece rates	0.111	0.314	0	1	0.040	0.195	0	1
Individual bonuses	0.156	0.363	0	1	0.106	0.308	0	1
Team bonuses	0.090	0.287	0	1	0.089	0.285	0	1
Gain sharing	0.116	0.320	0	1	0.143	0.350	0	1
Share income	0.029	0.167	0	1	0.052	0.222	0	1
Nonmonetary benefits	0.198	0.399	0	1				

Other benefits					6.353	3.018	0	9
Work discretion	0.661	0.388	0	1	0.773	0.334	0	1
Schedule								
No discretion	0.695	0.460	0	1	0.339	0.474	0	1
Choose fixed schedule	0.080	0.271	0	1	0.100	0.300	0	1
Adapt within limits	0.184	0.388	0	1	0.480	0.500	0	1
Self determined	0.041	0.199	0	1	0.081	0.272	0	1
Respondent cooperation	4.646	0.593	1	5				
Observations	25,429				2,743			

Variable definitions and sources are given in Appendix Tables A2.1 and A2.2. Summary statistics are based on the largest number of observations in each source for which all variables are available. This corresponds to the specifications in Columns 2 and 3 in Table 2 (EWCS 2015) and Column 2 in Table 3 (AWCS 2015/2018). For brevity, summary statistics are omitted for firm or establishment sizes, education levels, sectors, industries, occupations, countries, contract types, race, and years.

TABLE 2. Work-intensity equations for Europe (EWCS 2015)

	(1)	(2)	(3)
Boss quality	-0.021*** (0.001)	-0.020*** (0.001)	-0.020*** (0.001)
<i>Standardized coefficient</i>	<i>-0.168</i>	<i>-0.163</i>	<i>-0.161</i>
Identified set (Oster 2019)	[-0.021; -0.019]	[-0.020; -0.018]	[-0.020; -0.018]
Training		0.006 (0.006)	0.007 (0.006)
Task rotation		0.059*** (0.013)	0.059*** (0.013)
Teamwork		0.026* (0.014)	0.026* (0.014)
Piece rates		0.119*** (0.018)	0.118*** (0.018)
Individual bonuses		0.055*** (0.014)	0.056*** (0.014)
Team bonuses		0.016 (0.017)	0.015 (0.017)
Gain sharing		-0.017 (0.018)	-0.016 (0.018)
Share income		0.060** (0.029)	0.058** (0.029)
Nonmonetary benefits		-0.026* (0.015)	-0.025 (0.015)
Work discretion		-0.221*** (0.017)	-0.220*** (0.017)
Schedule: Choose fixed schedule		-0.008 (0.018)	-0.009 (0.018)
Schedule: Adapt within limits		-0.033** (0.015)	-0.032** (0.015)
Schedule: Self determined		-0.063*** (0.022)	-0.062*** (0.022)
Respondent cooperation			-0.030*** (0.011)
Observations	26,109	25,429	25,429
R-squared	0.277	0.294	0.295

Heteroskedasticity-robust standard errors clustered by NUTS2 region in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Survey weights used throughout. All models include an intercept, and controls for individual, task, and employer characteristics (see Appendix Table A2.1).

TABLE 3. Work-intensity equations for the United States (AWCS 2015/2018):
Pooled estimates

	(1)	(2)
Boss quality	-0.043*** (0.011)	-0.035*** (0.011)
<i>Standardized coefficient</i>	<i>-0.125</i>	<i>-0.101</i>
Identified set (Oster 2019)	[-0.043; -0.042]	[-0.035; -0.030]
Training		-0.011 (0.016)
Teamwork		0.044 (0.048)
Piece rates		0.012 (0.133)
Individual bonuses		-0.011 (0.076)
Team bonuses		0.009 (0.082)
Gain sharing		-0.072 (0.067)
Share income		-0.106 (0.105)
Other benefits		-0.000 (0.009)
Work discretion		-0.310*** (0.076)
Schedule: Choose fixed schedule		-0.231*** (0.090)
Schedule: Adapt within limits		-0.052 (0.053)
Schedule: Self determined		0.046 (0.083)
Observations	2,925	2,743
R-squared	0.279	0.309

Robust employee-clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Survey weights used throughout. All models include an intercept, controls for employee, task, and organizational characteristics (see Appendix Table A2.2), and for survey year.

TABLE 4. Work intensity equations for the United States (AWCS 2015/2018): Fixed-effects estimates

Sample:	(1)	(2)	(3)	(4)	(5)
	Full sample		Same employer only		
			All	Same boss only	Different boss only
Boss quality	-0.039*** (0.015)	-0.048*** (0.012)	-0.038*** (0.012)	-0.032** (0.016)	-0.039** (0.015)
<i>Standardized coefficient</i>	<i>-0.131</i>	<i>-0.160</i>	<i>-0.130</i>	<i>-0.122</i>	<i>-0.116</i>
Training		0.040* (0.024)	0.012 (0.020)	-0.034 (0.025)	0.039 (0.026)
Teamwork		0.035 (0.052)	0.086 (0.056)	0.234** (0.098)	0.025 (0.064)
Piece rates		-0.059 (0.148)	-0.255 (0.169)	0.057 (0.213)	-0.150 (0.200)
Individual bonuses		0.071 (0.082)	0.031 (0.094)	0.283** (0.131)	-0.069 (0.094)
Team bonuses		-0.098 (0.078)	-0.118 (0.090)	-0.243** (0.105)	-0.017 (0.134)
Gain sharing		-0.083 (0.074)	-0.165** (0.075)	-0.104 (0.121)	-0.115 (0.084)
Share income		-0.089 (0.101)	-0.194 (0.119)	-0.268* (0.140)	-0.124 (0.177)
Other benefits		-0.002 (0.015)	-0.007 (0.018)	0.009 (0.020)	0.006 (0.023)
Work discretion		-0.345*** (0.088)	-0.167** (0.082)	-0.116 (0.141)	-0.292*** (0.094)
Schedule: Choose fixed schedule		-0.137 (0.084)	-0.087 (0.087)	-0.187** (0.091)	0.157 (0.120)
Schedule: Adapt within limits		0.080 (0.058)	0.116** (0.058)	0.068 (0.078)	0.168** (0.074)
Schedule: Self determined		0.017 (0.114)	0.192 (0.124)	0.199 (0.148)	0.273* (0.152)
R-squared (within)	0.310	0.409	0.438	0.616	0.480
Employee-years	2,082	1,898	1,480	562	918

Robust employee-clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Longitudinal survey weights used throughout. All models include controls for employee, task, and organizational characteristics (see Appendix Table A2.2), and for survey year. Columns 1-2 include occupation fixed effects, but in Columns 3-5, occupations are omitted due to strong collinearity with employee fixed effects, and firm tenure drops out because the within-employee, within-employer change in tenure is equal to three years for all employees.

TABLE 5. Work intensity equations for the United States (AWCS 2018):
Conditional-change and lagged dependent-variable estimates

	(1)	(2)	(3)	(4)
Δ Boss quality	-0.034** (0.016)	-0.038*** (0.014)		
<i>Standardized coefficient</i>	-0.112	-0.126		
Boss quality (2018)			-0.029** (0.013)	-0.032*** (0.012)
<i>Standardized coefficient</i>			-0.0780	-0.0866
Boss quality (2015)	-0.022 (0.022)	-0.028 (0.018)		
Work intensity (2015)			0.448*** (0.039)	0.444*** (0.038)
Observations	1,065	1,011	1,083	1,028
R-squared	0.381	0.446	0.509	0.563
HR practices	N	Y	N	Y

Heteroskedasticity-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Survey weights used throughout. All models include an intercept, and controls for individual, task, and employer characteristics (see Appendix Table A2.2).

TABLE 6. Definitions of binary variables for employee, task, and organizational characteristics (EWCS 2015)

Characteristics	Definition	Question #
Employee		
Female employee	= 1 if employee is a woman	2a
Young employee	= 1 if employee age is below the sample median	2b
Blue-collar worker	= 1 if employee occupation is one of ISCO-08 major groups 6 (Skilled agricultural, forestry and fishery workers), 7 (Craft and related trades workers), 8 (Plant and machine operators, and assemblers), or 9 (Elementary occupations)	5, 6
Precarious contract	= 1 if employee does not have an indefinite contract	11
Job insecurity	= 1 if employee strongly agrees with the statement 'I might lose my job in the next 6 months'	89G
Task		
Short repetitive tasks	= 1 if job involves repetitive tasks of less than 1 minute	48A
Longer repetitive tasks	= 1 if job involves repetitive tasks of less than 10 minutes	48B
Monotonous tasks	= 1 if job involves monotonous tasks	53D
Simple tasks	= 1 if job does not involve complex tasks	53E
No work discretion	= 1 if employee cannot choose or change the order of tasks, methods of work, and speed or rate of work	54
No schedule discretion	= 1 if employer sets working time arrangements	42
Organization		
Small organization	= 1 if employer has 2-9 employees	16b
Private-sector firm	= 1 if employer is in private sector	14
Absence of employee representation	= 1 if employer has no trade union, works council, or similar committee representing employees	71A

TABLE 7. Boss-quality associations with work intensity in subgroups of employees
(EWCS 2015)

	No	Yes	<i>t</i> -stat of difference	Significance of difference	
				Independent tests	Bonferroni
Employee characteristics					
Female employee	-0.018	-0.022	-2.02	**	
Young employee	-0.019	-0.022	-1.77	*	
Blue-collar worker	-0.019	-0.023	-1.78	*	
Precarious contract	-0.020	-0.022	-0.94		
Job insecurity	-0.019	-0.028	-2.83	***	*
Task characteristics					
Short repetitive tasks	-0.020	-0.022	-1.09		
Longer repetitive tasks	-0.019	-0.022	-2.10	**	
Monotonous tasks	-0.019	-0.021	-1.51		
Simple tasks	-0.020	-0.021	-0.43		
No work discretion	-0.019	-0.025	-2.37	**	
No schedule discretion	-0.017	-0.021	-2.27	**	
Employer characteristics					
Small organization	-0.019	-0.026	-2.98	***	**
Private-sector firm	-0.014	-0.023	-5.29	***	***
Absence of employee representation	-0.017	-0.024	-4.84	***	***

N = 25,429 (N = 25,426 for Blue-collar worker; N = 23,947 for Job insecurity)

*** p<0.01, ** p<0.05, * p<0.1

Survey weights used throughout. Each row shows subsample coefficients of boss quality implied by a regression including one interaction term between boss quality and the specific characteristic in that row. All models include an intercept, and controls for individual, task, and employer characteristics (see Appendix Table A2.1).

ENDNOTES

¹ Goh et al. (2016) refer to work intensity as “high job demands,” which they measure using a combination of four questions from the U.S. General Social Survey for 2002, 2006, and 2010: (1) ‘*My job requires that I work very fast,*’ (2) ‘*I have too much work to do everything well,*’ (3) ‘*How often are there not enough people or staff to get all the work done?,*’ and (4) ‘*I have enough time to get the job done.*’ These questions closely resemble ones commonly used to gauge work intensity in other representative datasets (see Green et al. 2022) and all capture the amount of required effort relative to available working time.

² Even in the adjacent organizational literature, the role of supervisors as direct determinants of how intensively employees work has received limited systematic attention. For example, a recent conceptual and meta-analytic review did not identify studies linking supervisors to work effort (Van Iddekinge et al. 2023).

³ One could also use the first principal component rather than an average (e.g., Green et al. 2022: 466). When we did so, all our reported results replicated. In our specific two datasets, this is unsurprising given the strong correlation between the average and the first principal component ($r > .99$). Nevertheless, for the sake of simplicity and replicability in other datasets, we opted for the average because principal-component weights are sample-dependent, by reflecting the covariance structure in a specific dataset.

⁴ Even though this seventh item occurs elsewhere in the EWCS, has different scale anchors, and refers to the employee’s ‘manager’ rather than their ‘immediate boss,’ we follow Artz et al. (2020) in using this item and treating its stem and scale as practically equivalent to the stem and scale used for the other six statements about an employee’s immediate boss. Reassuringly, our results do not depend on the inclusion of this seventh item.

⁵ All our reported results replicated when we used factor scores instead of sums. In our specific two datasets, this is unsurprising given the strong correlation between the sums and the factor scores ($r > .995$). Nevertheless, for consistency with Artz et al. (2020) and for replicability in other datasets, we opted for the sum because factor scores are sample-dependent, by reflecting the covariance structure in a specific dataset.

⁶ This index based on items measured on a binary agree/disagree scale only counts positive sentiments towards bosses (e.g., as in Hoffman & Tadelis 2021). Once we converted the 5-point scales used in the EWCS to dummies coded ‘1’ for ‘Tend to agree’ and ‘Strongly agree’ (or ‘Most of the time’ and ‘Always’), and ‘0’ otherwise, and we constructed the boss-quality index for the EWCS using these dummies, our results were very similar.

⁷ We cluster standard errors by NUTS2 region because that was the most common geographic level at which stratification occurred within the countries included in the EWCS 2015. When we instead clustered the standard errors by country or by country-industry, we reached identical inferences from estimates of equation (1).

⁸ Clark, D’Ambrosio, and Zhu (2021) offer an example applying this method to data from the EWCS 2015 and Bäker et al. (2026) apply the method to estimates of boss quality.

⁹ Appendix Figure A3 shows a histogram of the change in boss quality within employees over time. Boss quality changes for over half of the respondents. About half of the employees reporting a change in boss quality report it decreasing while the other half report it increasing.

¹⁰ We use the EWCS for our main analysis of the heterogeneous effects of boss quality because its large sample size is appropriate for reliably estimating interaction effects. The AWCS has a much smaller sample size, which is well-known both to be more likely to produce noisy estimates of interaction effects and to have a higher likelihood of an incorrectly estimated sign relative to the true interaction effect, even if the estimates are unbiased (e.g., Gelman & Carlin 2014). Nevertheless, when presenting the estimates for the EWCS, we will point to the associated AWCS estimates in an appendix for a comparison.

¹¹ The estimates in Table 2 are based on just over 70% of all the employees surveyed in the EWCS. This reduction in the sample size is standard and unavoidable in studies using surveys such as the EWCS. Appendix Table A3.1 accounts for the reduced sample size. Supplementary analyses suggest that the analysis sample is not selected in ways that are problematic for the inferences we draw. For example, when considering all available observations, the distributions of the boss-quality and work-intensity variables are strongly consistent with the distributions of these two variables in the smaller final analysis sample (see Appendix Figures A4.1 and A4.2). Also, we estimated a simple linear regression model including only boss quality as predictor, increasing the effective sample size ($N = 31,841$), and we then estimated that same model on the smaller final analysis sample ($N = 25,429$). Appendix Table A3.2 shows that the resulting boss-quality coefficients are virtually identical.

¹² In a supplementary analysis, we followed precedent in the boss-quality literature (e.g., Artz et al. 2017, 2020) by also adjusting for a respondent’s cheerful mood. This variable captured answers to the question ‘*Over the last two weeks...I have felt cheerful and in good spirits*’ on a 6-point scale anchored by ‘At no time’ and ‘All the time.’ Like the adjustment for a respondent’s cooperation during the interview, the theory is that this variable may absorb some

of the respondent's tendency to give generally positive or negative answers. Reassuringly, when including this variable, the boss-quality effect remained virtually unaffected (see Column 1 in Appendix Table A4). The specification including this additional control must be interpreted with caution because the variable captures self-reported cheerfulness over the last two weeks, which may be a consequence both of boss quality and of work intensity, possibly rendering the variable a "bad control" (Hünemann, Louw, & Rönkkö 2025).

¹³ In the EWCS, a different possible source of common-method bias arises from response tendencies induced by the interviewer, in terms of how their interpretation and style affect interviewees' responses. In a supplementary analysis, we exploited the fact that most of the interviewers ran at least two interviews, which allowed us to follow the survey literature in economics (e.g., Bloom & Van Reenen 2010a) by absorbing interviewer fixed effects in the estimates of equation (1). Reassuringly, these fixed effects did not attenuate the boss-quality coefficient (see Column 2 in Appendix Table A4).

¹⁴ The estimates in Table 2 and the effect-size interpretations assume that the association between boss quality and work intensity is linear. Appendix Figure A5.1 shows four binned scatter plots of the association between boss quality and work intensity in the EWCS 2015: one of the zero-order association without controls and three matching the specifications in Table 2. All four plots reveal an essentially linear negative association.

¹⁵ As in the EWCS (see Endnote 12), in the AWCS we also followed precedent in the boss-quality literature (e.g., Bäker & Goodall 2020) by adjusting for a respondent's general life satisfaction. This variable captured answers to the question '*Using a scale of 1 to 10 where 1 means "Very dissatisfied" and 10 means "Very satisfied," how do you feel about your life as a whole right now?*' The boss-quality effect remained virtually unaffected (see Column 3 in Appendix Table A4). Again, these estimates must be viewed with some caution because the life-satisfaction variable presents possible interpretation challenges similar to the measure of cheerful mood in the EWCS.

¹⁶ As in Table 2, the estimates in Table 3 also assume that the association between boss quality and work intensity is linear. Appendix Figure A5.2 shows three binned scatter plots of the association between boss quality and work intensity in the AWCS data pooled across 2015 and 2018: one of the zero-order association without controls and two matching the specifications in Table 3. All three plots reveal an essentially linear negative association.

¹⁷ The longitudinal weights account for the survey's sampling design, nonresponse at baseline (2015), attrition between the 2015 and 2018 waves, and calibration to 2015 Current Population Survey population margins. This is important because not all employees responding in 2015 responded in 2018. Appendix Table A5 shows linear probability estimates predicting whether or not a responding employee in 2015 also responded in 2018, as a function of all variables for 2015. Even ignoring multiple-testing concerns, only employee tenure, being black/African American, having supervisory responsibility, and having other benefits predict an individual's probability of being present in the 2018 data, the former two decreasing this likelihood and the latter two increasing it.

¹⁸ Appendix Table A7.2 shows results for the AWCS for comparison, with Appendix Table A7.1 defining the characteristics. In the AWCS, we hesitate to read into individual coefficients due to the interrelated issues of noise, sign uncertainty, and statistical insignificance. Still, we can draw a qualitative inference from the consistency of the signs across the test statistics, as eight of the ten interaction effects are directionally consistent among themselves. We also note that the eight directionally consistent test statistics in the AWCS have a negative sign, which is directionally consistent with the interactions we observed in the EWCS (Table 7).

¹⁹ Consistent with these results regarding organizational characteristics, a supplementary analysis revealed that boss quality is more-strongly positively associated with employee job satisfaction in private-sector and small firms without employee representation (see Appendix Table A8).

²⁰ We base this inference on three considerations. First, Appendix Tables A9.1 and A9.2 show that higher boss quality predicts a fairer distribution of work (Column 2) much more strongly than it predicts the reduced control over subordinates' working pace (Column 1). Second, pace control and the fair distribution of work both predict work intensity, the former increasing and the latter decreasing it (Column 3). Third, a comparison of Columns 5-7 to the specification without controls for these two mechanisms (Column 4) shows that the negative association between boss quality and work intensity is meaningfully attenuated when *Work distributed fairly* is included but not when *Boss controls pace* is.

Boss Quality and Employee Work Intensity: Evidence from Europe and the United States

APPENDIX

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TABLE A1. Principal components analysis of work intensity and factor analysis of boss quality

	EWCS	AWCS
	Eigenvalues	
Work intensity: Principal components analysis		
Component 1	1.83	1.83
Component 2	0.83	0.84
Boss quality: Factor analysis		
Factor 1	4.54	5.56
Factor 2	0.06	0.21
	Loadings	
Work intensity:		
High speed	0.64	0.64
Tight deadlines	0.65	0.65
Not enough time	0.42	0.40
Boss quality:		
Boss trusts you		0.88
Boss respects you	0.79	0.92
Boss gives praise/recognition	0.83	0.88
Boss gets people to work together	0.82	0.87
Boss is helpful	0.79	0.87
Boss provides useful feedback	0.84	0.90
Boss encourages and supports your development	0.88	0.92
Manager helps and supports you	0.69	

TABLE A2.1. European Working Conditions Survey (2015): Variable definitions and sources

Variable	Questions	Scale	Question #
Work intensity	Simple average of standardized answers to: Does your job involve working at very high speed? Does your job involve working to tight deadlines? You have enough time to get the job done	1 (never) - 7 (all of the time) 1 (never) - 7 (all of the time) 1 (always) - 5 (never)	49A 49B 61G
Boss quality	Sum of answers to: Your immediate boss respects you as a person Your immediate boss gives you praise and recognition when you do a good job Your immediate boss is successful in getting people to work together Your immediate boss is helpful in getting the job done Your immediate boss provides useful feedback on your work Your immediate boss encourages and supports your development Your manager helps and supports you	1 (strongly disagree) - 5 (strongly agree) 1 (strongly disagree) - 5 (strongly agree) 1 (strongly disagree) - 5 (strongly agree) 1 (strongly disagree) - 5 (strongly agree) 1 (strongly disagree) - 5 (strongly agree) 1 (strongly disagree) - 5 (strongly agree) 1 (never) - 5 (always)	63A 63B 63C 63D 63E 63F 61B
Female employee	Gender	0 = male; 1 = female	2a
Employee age / Employee age squared	How old are you?	Continuous	2b
Employee tenure	How many years have you been in your company or organisation?	Continuous	17
Supervisory responsibility	Dummy for whether answer is 0 or > 0 to: How many people work under your supervision, for whom pay increases, bonuses or promotion depend directly on you?	0 = no; 1 = yes	23
Fulltime	And do you work part time or full time?	0 = part time; 1 = full time	2d
Weekly hours worked	How many hours do you usually work per week in your main paid job?	Continuous	24
Physical health	How is your health in general? Would you say it is ...	1 (very bad) - 5 (very good)	75
Self-reported skill level	Which of the following statements would best describe your skills in your own work?	1 (I need further training to cope well with my duties) 2 (My present skills correspond well with my duties) 3 (I have the skills to cope with more demanding duties)	64

Computer use	Does your main paid job involve Working with computers, laptops, smartphones etc.?	1 (never) - 7 (all of the time)	30I
Task uncertainty	How often do you have to interrupt a task you are doing in order to take on an unforeseen task?	0 (never) - 3 (very often)	51
Short repetitive tasks	Does your job involve short repetitive tasks of less than 1 minute?	0 = no; 1 = yes	48A
Longer repetitive tasks	Does your job involve short repetitive tasks of less than 10 minutes?	0 = no; 1 = yes	48B
Monotonous tasks	Generally, does your main paid job involve monotonous tasks?	0 = no; 1 = yes	53D
Complex tasks	Generally, does your main paid job involve complex tasks?	0 = no; 1 = yes	53E
Employees are represented	Does the following exist at your company or organisation: Trade union, works council or a similar committee representing employees?	0 = no; 1 = yes	71A
Firm size	How many employees in total work in your company or organisation - business?	Dummies (0/1) for 10-249 and 250+ people; 2-9 people is the reference category	16b
Training	Sum of answers to:		
	Over the past 12 months, have you undergone training paid for or provided by your employer to improve your skills?	0 = no; 1 = yes	65A
	Over the past 12 months, have you undergone training paid for by yourself to improve your skills?	0 = no; 1 = yes	65B
	Over the past 12 months, have you undergone on-the-job training to improve your skills?	0 = no; 1 = yes	65C
	Over the past 12 months, have you undergone other training to improve your skills?	0 = no; 1 = yes	65D
Task rotation	Does your job involve rotating tasks between yourself and colleagues?	0 = no; 1 = yes	55
Teamwork	Do you work in a group or team that has common tasks and can plan its work?	0 = no; 1 = yes	58
Piece rates	Do the earnings from your main job include piece rate or productivity payments?	0 = no; 1 = yes	101B
Individual bonuses	Do the earnings from your main job include payments based on your individual performance?	0 = no; 1 = yes	101F

Team bonuses	Do the earnings from your main job include payments based on the performance of your team / working group / department?	0 = no; 1 = yes	101G
Gain sharing	Do the earnings from your main job include payments based on the overall performance of the company (profit sharing scheme) where you work?	0 = no; 1 = yes	101H
Share income	Do the earnings from your main job include income from shares in the company you work for?	0 = no; 1 = yes	101I
Nonmonetary benefits	Do the earnings from your main job include advantages of other nature (for instance medical services, access to shops, etc.)?	0 = no; 1 = yes	101J
Work discretion	Simple average of answers to: Are you able to choose or change your order of tasks? Are you able to choose or change your methods of work? Are you able to choose or change your speed or rate of work?	0 = no; 1 = yes 0 = no; 1 = yes 0 = no; 1 = yes	54A 54B 54C
Schedule	How are your working time arrangements set?	Dummies (0/1) for 'You can choose between several fixed working schedules determined by the company/organisation'; 'You can adapt your working hours within certain limits (e.g. flextime)'; and 'Your working hours are entirely determined by yourself'; reference category is 'They are set by the company / organisation with no possibility for changes'	42
Respondent cooperation	Respondent cooperation	1 (very poor) - 5 (very good)	P5
Education	Dummy variables for one-digit ISCED education levels		106
Sector	Dummy variables for private, public, joint private-public, not-for-profit, and other sectors		14
Industry	Dummy variables for two-digit NACE industry sections		13
Occupation	Dummy variables for two-digit ISCO-88 occupations		5, 6
Country	Dummy variables for country of interview		P3b
Contract type	Dummy variables for permanent contract, fixed term contract, temporary employment agency contract, apprenticeship or other training scheme, no contract, and other contract		11

TABLE A2.2. American Working Conditions Survey (2015/2018): Variable definitions and sources

Variable	Questions	Scale	AWCS Variable Name
Work intensity	Simple average of standardized answers to: Does your job involve work at very high speed? Does your job involve work to tight deadlines? Enough time to finish work	1 (never) - 7 (all of the time) 1 (never) - 7 (all of the time) 1 (always) - 5 (never)	q45a q45b q52a
Boss quality	Sum of answers to: Your immediate boss trusts you Your immediate boss respects you Your immediate boss gives praise/recognition Your immediate boss gets people to work together Your immediate boss is helpful Your immediate boss provides useful feedback Your immediate boss encourages & supports your development	0 (disagree) - 1 (agree) 0 (disagree) - 1 (agree) 0 (disagree) - 1 (agree) 0 (disagree) - 1 (agree) 0 (disagree) - 1 (agree) 0 (disagree) - 1 (agree) 0 (disagree) - 1 (agree)	q58a q58b q58c q58d q58e q58f q58g
Female employee	What is your gender?	0 = male; 1 = female	gender
Employee age / Employee age squared	Calculated age	Continuous	calcage
Employee tenure	How long have you been working at this company / organization?	Continuous	q12_duration
Supervisory responsibility	Dummy for whether answer is 0 or > 0 to: How many people work under your supervision, for whom pay increases, bonuses, or promotion depend directly on you?	 0 = no; 1 = yes	 q17
Hours	How many hours per week do you usually work in your MAIN paid job?	Continuous	q18
Days	How many days per week do you usually work in your MAIN paid job?	1 - 7	q20
Physical health	How is your health in general? Would you say it is ...	0 (poor) - 4 (excellent)	q68
Self-reported skill level	Which of the following statements would best describe your skills in your own work?	1 (I need further training to cope well with my duties) 2 (I am currently acquiring the skills needed (or learning them on the job)) 3 (My present skills correspond well with my duties)	q60

		4 (I have the skills to cope with more demanding duties)	
Computer use	Does your main paid job involve working w/ computers?	1 (never) - 7 (all of the time)	q24i
Task uncertainty	How often do you have to interrupt a task you are doing in order to take on an unforeseen task?	0 (never) - 3 (very often)	q47
Monotonous tasks	Generally, does your main paid job involve monotonous tasks?	0 = no; 1 = yes	q49d
Complex tasks	Generally, does your main paid job involve complex tasks?	0 = no; 1 = yes	q49e
Union	Are you a member of a labor union or of an employee association similar to a union?	0 = no; 1 = yes	n7
Establishment size	How many people work at your workplace (at the local site)?	Dummies (0/1) for 2-5, 6-10, 11-24, 25-49, 50-99, 100-249, 250-499, and 500+ people; 1 person is the reference category	q11
Training	Sum of answers to:		
	Over the past 12 months, have you undergone training paid for or provided by your employer/self to improve your skills?	0 = no; 1 = yes	q61a
	Over the past 12 months, have you undergone training done on your own initiative outside workplace to improve your skills?	0 = no; 1 = yes	q61b
	Over the past 12 months, have you undergone training done on your own initiative inside workplace to improve your skills?	0 = no; 1 = yes	q61c
	Over the past 12 months, have you undergone on-the-job training to improve your skills?	0 = no; 1 = yes	q61d
Teamwork	Do you work in a group or team that has common tasks and can plan its work?	0 = no; 1 = yes	q56
Piece rates	Do the earnings from your main job include piece rate or productivity payments?	0 = no; 1 = yes	ef7c
Individual bonuses	Do the earnings from your main job include payments based on your individual performance?	0 = no; 1 = yes	ef7d
Team bonuses	Do the earnings from your main job include payments based on the performance of your team?	0 = no; 1 = yes	ef7g

Gain sharing	Do the earnings from your main job include payments based on company performance?	0 = no; 1 = yes	ef7h
Share income	Do the earnings from your main job include income from company shares?	0 = no; 1 = yes	ef7i
Other benefits	Sum of answers to:		
	Which of the following benefits does your employer...offer you?	0 = no; 1 = yes	n4a
	Paid sick time	0 = no; 1 = yes	n4b
	Paid vacation time	0 = no; 1 = yes	n4c
	Paid holidays	0 = no; 1 = yes	n4d
	Health insurance	0 = no; 1 = yes	n4e
	Dental insurance	0 = no; 1 = yes	n4f
	Pension/retirement benefits	0 = no; 1 = yes	n4g
	Life insurance	0 = no; 1 = yes	n4h
	Disability insurance	0 = no; 1 = yes	n4i
	Flexible spending account	0 = no; 1 = yes	n4j
Work discretion	Simple average of answers to:		
	Are you able to choose or change order of tasks?	0 = no; 1 = yes	q50a
	Are you able to choose or change methods of work?	0 = no; 1 = yes	q50b
	Are you able to choose or change speed / rate of work?	0 = no; 1 = yes	q50c
Schedule	How are your working time arrangements set?	Dummies (0/1) for 'I can choose between several fixed working schedules determined by the company/organisation'; 'I can adapt my working hours within certain limits'; and 'My working hours are entirely determined by me'; the reference category is 'They are set by the company / organisation with no possibility for changes'	q39
Education	Dummy variables for highest education level	Dummies (0/1) for High school, Bachelors, Masters, and Doctoral degree; 12th grade NO DIPLOMA or below is the reference category	highesteducation
Sector	Dummy variables for private, public, and nonprofit sectors		q10
Industry	Dummy variables for two-digit NAICS codes		q9_industrycode

Occupation	Dummy variables for two-digit SOC occupations	q3_occupationcode
Year	Dummy variable for 2018 wave of survey	
Ethnicity	Dummy variables for White / Caucasian, Black / African American, American Indian or Alaskan Native, Asian or Pacific Islander, and Other	ethnicity

TABLE A3.1. Sample reduction in the EWCS

Step	Sample size	Observation loss	Reason
All interviewed workers	43,850	na	Full 2015 EWCS
Workers with an employer (employees)	35,621	-8,229	Removal of non-employees
...and non-missing on dependent variable	35,138	-483	Missing DV
...and non-missing on independent variable	31,841	-3,297	Missing IV
...and non-missing on covariates	25,429	-6,412	Missing covariates

TABLE A3.2. Stability of boss-quality coefficient in the EWCS

	(1) All available observations	(2) Final analysis sample
Boss quality	-0.026*** (0.001)	-0.025*** (0.001)
<i>Standardized coefficient</i>	<i>-0.205</i>	<i>-0.203</i>
Observations	31,841	25,429
R-squared	0.042	0.041

Heteroskedasticity-robust standard errors clustered by NUTS2 region in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Survey weights used throughout. All models include an intercept.

TABLE A4. Controlling for sources of common-method bias

	(1)	(2)	(3)
	EWCS		AWCS
Boss quality	-0.018*** (0.001)	-0.019*** (0.001)	-0.031*** (0.011)
Cheerful	-0.057*** (0.005)		
Life satisfaction			-0.029** (0.012)
Interviewer fixed effects	N	Y	N
Observations	25,404	25,429	2,741
R-squared	0.300	0.450	0.311
Control variables as in:	Column 3, Table 2	Column 3, Table 2	Column 2, Table 3
Robust standard errors clustered by:	NUTS2 region	NUTS2 region	Employee

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Survey weights used throughout. All models include an intercept. Interviewers are nested within countries, so interviewer fixed effects absorb country fixed effects.

TABLE A5. Linear probability estimates of presence in second wave (AWCS)

	Coef.	SE
Work intensity	-0.007	(0.017)
Boss quality	0.008	(0.006)
Female employee	0.017	(0.027)
Employee age	-0.002	(0.001)
Employee tenure	-0.003	* (0.001)
Education (Default = Basic)		
High school	0.025	(0.041)
Bachelors degree	0.021	(0.030)
Masters degree	0.032	(0.039)
Doctoral degree	-0.083	(0.071)
Ethnicity (Default = White/Caucasian)		
Black/African American	-0.096	** (0.041)
American Indian or Alaskan Native	-0.069	(0.145)
Asian or Pacific Islander	0.023	(0.060)
Other ethnicity	-0.062	(0.048)
Supervisory responsibility	0.050	* (0.029)
Hours	0.002	(0.001)
Days	0.020	(0.019)
Union	0.036	(0.035)
Physical health	-0.000	(0.014)
Task uncertainty	0.007	(0.015)
Self-reported skill level	0.003	(0.016)
Computer use	0.003	(0.007)
Monotonous tasks	0.016	(0.024)
Complex tasks	-0.045	(0.029)
Training	-0.000	(0.010)
Teamwork	-0.020	(0.025)
Piece rates	-0.053	(0.072)
Individual bonuses	0.019	(0.041)
Team bonuses	0.065	(0.045)
Gain sharing	0.007	(0.040)
Share income	0.023	(0.058)
Other benefits	0.015	*** (0.005)
Work discretion	-0.055	(0.038)
Schedule discretion (Default = No discretion)		
Schedule: Choose fixed schedule	-0.024	(0.043)
Schedule: Adapt within limits	0.029	(0.028)
Schedule: Self determined	0.049	(0.048)
Sector (Default = Private sector)		
Public sector	-0.002	(0.030)
Nonprofit sector	0.048	(0.039)
Observations	1,609	
R-squared	0.080	

Heteroskedasticity-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The model also includes an intercept and fixed effects for occupations, industries, and establishment size. All predictors pertain to 2015. The dependent variable is 1 if a responding employee in 2015 also responded in 2018, and 0 otherwise.

TABLE A6. Linear probability estimates of boss change among remainers (AWCS)

Work intensity (2015)	-0.020 (0.031)
Boss quality (2015)	0.026** (0.011)
Observations	899
R-squared	0.267

Robust employee-clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Survey weights used. The model includes an intercept and control variables as in Column 2 of Table 3. All covariates pertain to 2015. The dependent variable is 1 if a respondent's boss changed between 2015 and 2018, and 0 otherwise. The sample is restricted to employees staying with the same employer between 2015 and 2018 (i.e., remainers).

TABLE A7.1. Definitions of binary variables for employee, task, and organizational characteristics (AWCS)

Characteristics	Definition	AWCS variable name
Employee		
Female employee	= 1 if employee is a woman	gender
Young employee	= 1 if employee age is below the sample median	calcage
Blue-collar worker	= 1 if employee occupation is one of Building and Grounds Cleaning and Maintenance Occupations; Farming, Fishing, and Forestry Occupations; Construction and Extraction Occupations; Installation, Maintenance, and Repair Occupations; Production Occupations; or Transportation and Material Moving Occupations	typework
Task		
Monotonous tasks	= 1 if job involves monotonous tasks	q49d
Simple tasks	= 1 if job does not involve complex tasks	q49e
No work discretion	= 1 if employee cannot choose or change the order of tasks, methods of work, and speed or rate of work	q50a-c
No schedule discretion	= 1 if the employer sets working time arrangements	q39
Organization		
Small organization	= 1 if employer has fewer than 50 employees	q11b
Private-sector firm	= 1 if employer is in private sector	q10
Absence of employee representation	= 1 if employee is not a member of a labor union or of an employee association similar to a union	n7

TABLE A7.2. Boss-quality associations with work intensity in subgroups of employees (AWCS)

	No	Yes	<i>t</i> -stat of difference	Significance of difference	
				Independent tests	Bonferroni
Employee characteristics					
Female employee	-0.030	-0.035	-0.23		
Young employee	-0.023	-0.037	-0.70		
Blue-collar worker	-0.032	-0.032	-0.00		
Task characteristics					
Monotonous tasks	-0.057	-0.022	1.31		
Simple tasks	-0.016	-0.062	-2.06	**	
No work discretion	-0.020	-0.097	-2.76	**	*
No schedule discretion	0.004	-0.074	-3.92	***	***
Organizational characteristics					
Small organization	-0.029	-0.092	-1.24		
Private-sector firm	-0.048	-0.019	1.31		
Absence of employee representation	-0.012	-0.038	-0.71		

N = 2,741 (N = 2,728 for Blue-collar worker)

*** p<0.01, ** p<0.05, * p<0.1

Survey weights used throughout. Each row shows subsample coefficients of boss quality implied by a regression including one interaction term between boss quality and the specific characteristic in that row. All models include an intercept, controls for individual, task, and employer characteristics (see Appendix Table A2.2), and for survey year.

TABLE A8. Boss-quality associations with job satisfaction in subgroups of employees (EWCS)

	No	Yes	<i>t</i> -stat of difference	Significance of difference	
				Independent tests	Bonferroni
Organizational characteristics					
Small organization	0.040	0.047	3.16	***	***
Private-sector firm	0.036	0.044	5.11	***	***
Absence of employee representation	0.038	0.045	3.81	***	***

N = 25,528

*** p<0.01, ** p<0.05, * p<0.1

Survey weights used throughout. Each row shows subsample coefficients of boss quality implied by a regression including one interaction term between boss quality and the specific characteristic in that row. The dependent variable is *Job satisfaction*, which captures, on a 4-point scale, answers to ‘*On the whole, are you very satisfied, satisfied, not very satisfied or not at all satisfied with working conditions in your main paid job?*’ Higher scores indicate higher job satisfaction. All models include an intercept, and controls for individual, task, and employer characteristics (see Appendix Table A2.1).

TABLE A9.1. Pace control and fair work distribution as mechanisms (EWCS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	Boss controls pace	Work distributed fairly			Work intensity		
Mechanisms:							
Boss controls pace			0.170*** (0.011)		0.173*** (0.012)		0.167*** (0.011)
Work distributed fairly			-0.132*** (0.006)			-0.105*** (0.006)	-0.104*** (0.006)
Boss quality	-0.002*** (0.001)	0.077*** (0.002)		-0.020*** (0.001)	-0.020*** (0.001)	-0.012*** (0.001)	-0.012*** (0.001)
<i>Standardized coefficient</i>	<i>-0.023</i>	<i>0.442</i>		<i>-0.161</i>	<i>-0.158</i>	<i>-0.098</i>	<i>-0.096</i>
Observations	25,319	25,338	26,394	25,429	25,188	25,205	24,972
R-squared	0.156	0.290	0.315	0.295	0.306	0.309	0.321

Heteroskedasticity-robust standard errors clustered by NUTS2 region in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Survey weights used throughout. All estimates include an intercept and control variables as in Column 3 of Table 2. The variable *Boss controls pace* captures answers to a yes/no question asking, ‘*On the whole, is your pace of work dependent on the direct control of your boss?*’ The variable *Work distributed fairly* captures answers to the statement ‘*The work is distributed fairly,*’ on a 5-point scale anchored by ‘Strongly disagree’ and ‘Strongly agree.’

TABLE A9.2. Pace control and fair work distribution as mechanisms (AWCS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	Boss controls pace	Work distributed fairly			Work intensity		
Mechanisms:							
Boss controls pace			0.134*** (0.037)		0.139*** (0.039)		0.135*** (0.037)
Work distributed fairly			-0.158*** (0.017)			-0.153*** (0.021)	-0.152*** (0.020)
Boss quality	0.011 (0.007)	0.183*** (0.015)		-0.035*** (0.011)	-0.036*** (0.011)	-0.007 (0.012)	-0.008 (0.012)
<i>Standardized coefficient</i>	<i>0.050</i>	<i>0.356</i>		<i>-0.101</i>	<i>-0.105</i>	<i>-0.019</i>	<i>-0.024</i>
Observations	2,743	2,743	2,745	2,743	2,743	2,743	2,743
R-squared	0.155	0.297	0.351	0.309	0.316	0.346	0.352

Robust employee-clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Survey weights used throughout. All estimates include an intercept and control variables as in Column 2 of Table 3. The variable *Boss controls pace* captures answers to a yes/no question asking, ‘*On the whole, is your pace of work dependent, or not, on direct control of boss/client?*’ The variable *Work distributed fairly* captures answers to the statement ‘*Work is distributed fairly,*’ on a 5-point scale anchored by ‘Strongly disagree’ and ‘Strongly agree.’

FIGURE A1. Histograms of work intensity

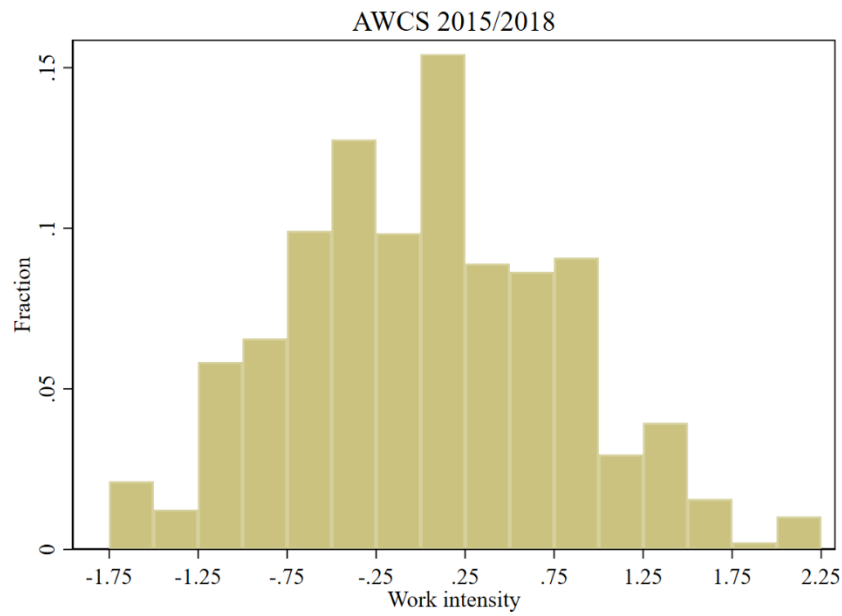
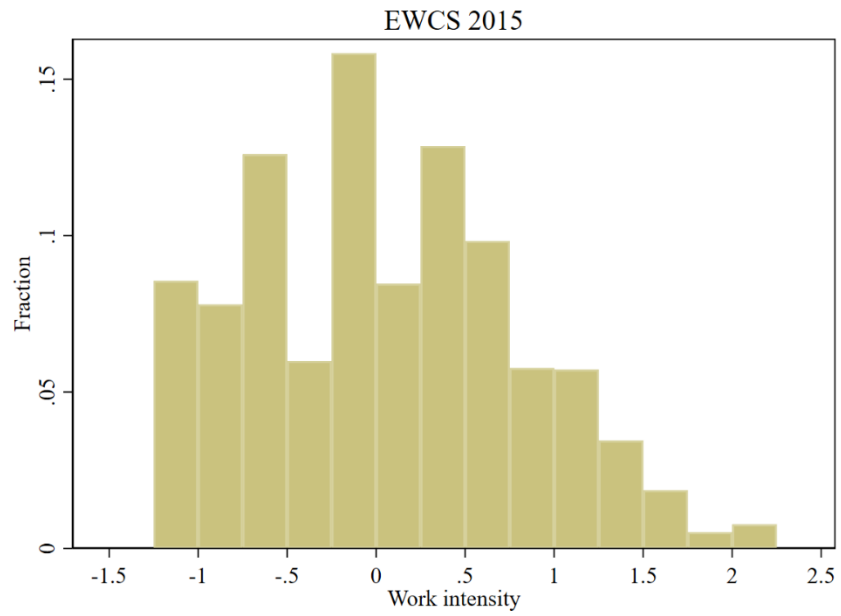


FIGURE A2. Histograms of boss quality

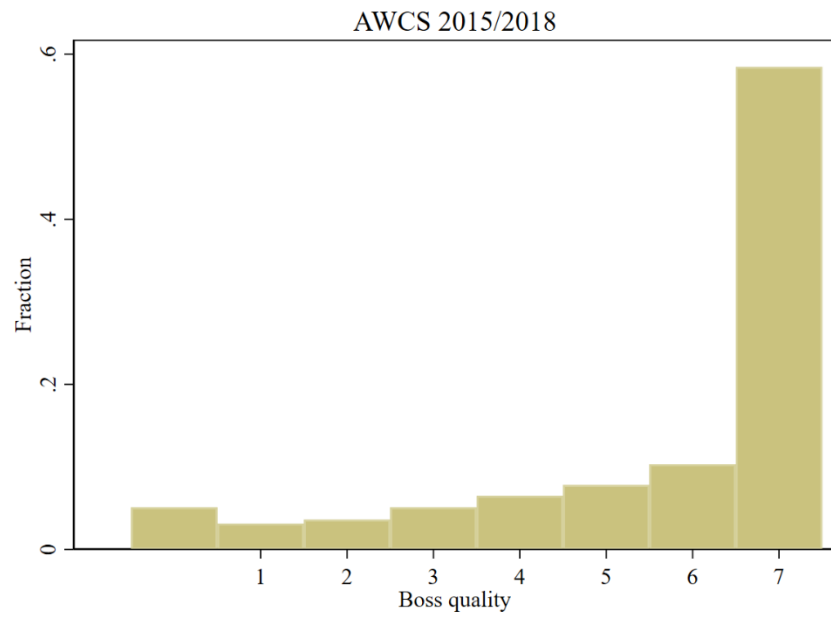
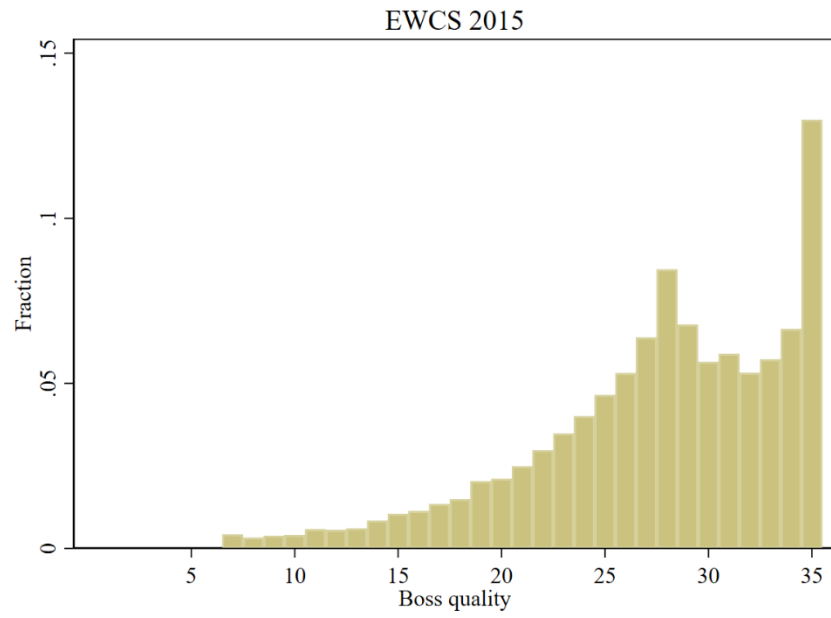


FIGURE A3. Within-employee changes in boss quality between 2015 and 2018 (AWCS)

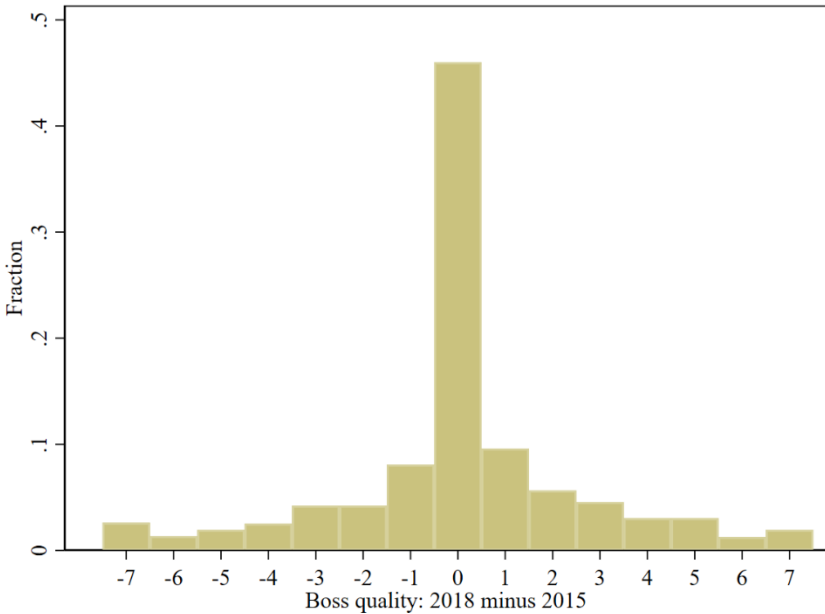


FIGURE A4.1. Work-intensity distribution (EWCS): All available data versus final sample

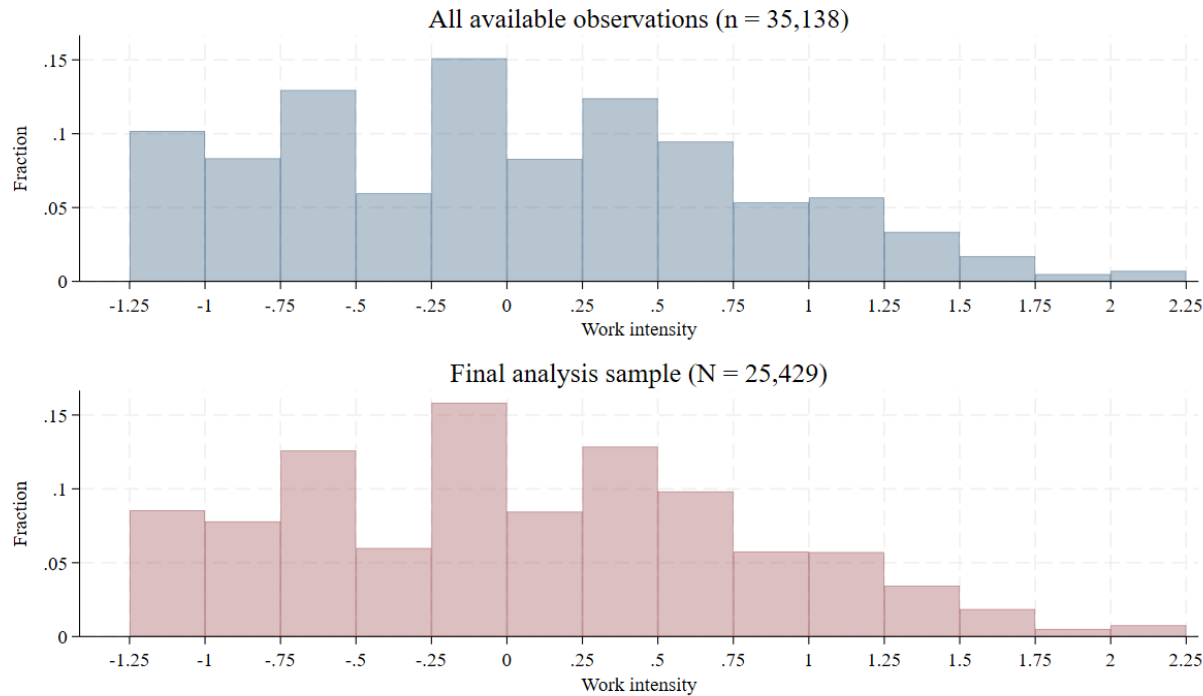


FIGURE A4.2. Boss-quality distribution (EWCS): All available data versus final sample

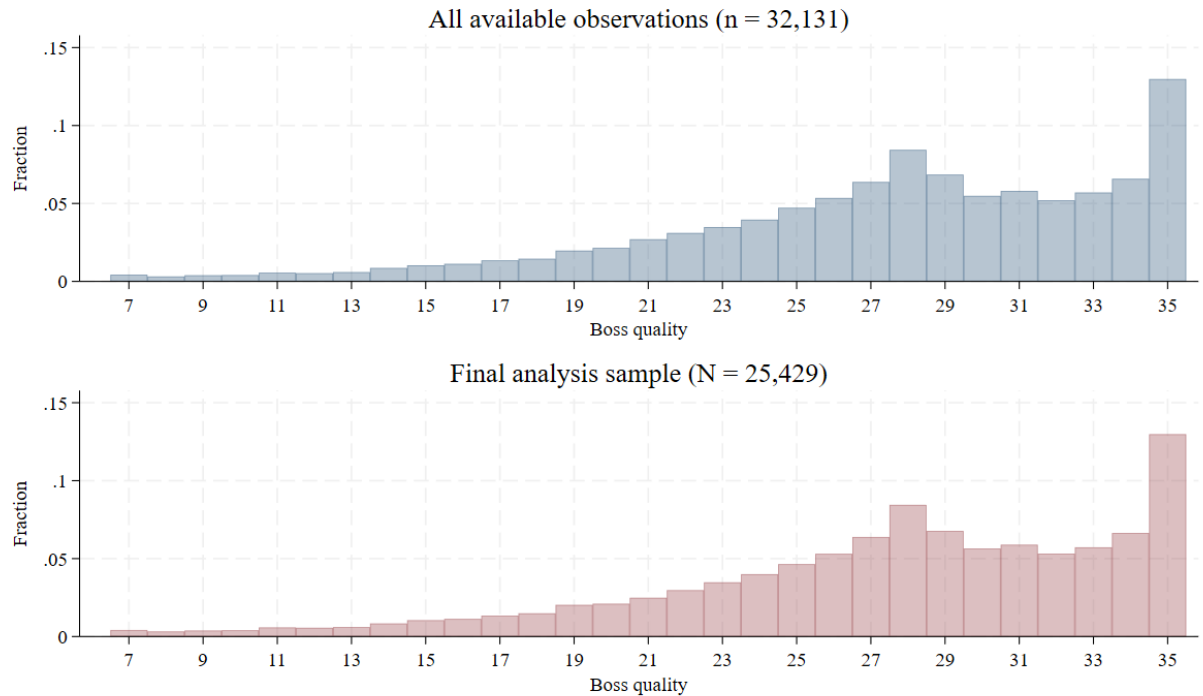


FIGURE A5.1. Binned scatter plots of boss-quality association with work intensity (EWCS)

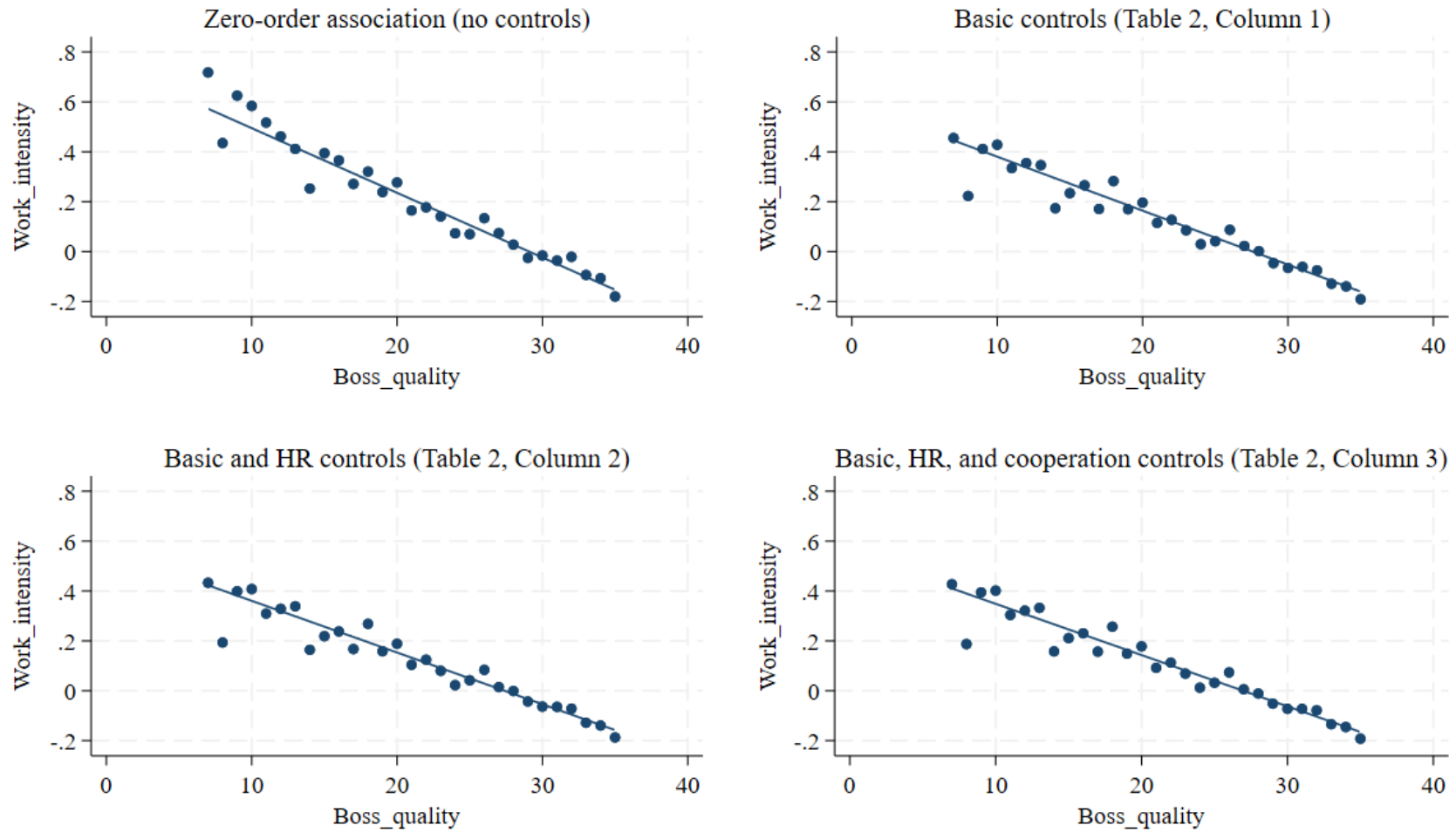


FIGURE A5.2. Binned scatter plots of boss-quality association with work intensity (AWCS)

