**Essays on Workplace Practices in Different Institutional Settings**

By

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SUBMITTED TO THE SLOAN SCHOOL OF MANAGEMENT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

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Submitted to the MIT Sloan School of Management on May 1, 2020 in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Management

## ABSTRACT

This dissertation consists of three essays investigating how *organizational policies* operate within different institutional contexts and in the face of migration, demographic shifts, and globalization. The first essay examines why, given apparent widespread violations, some migrant workers choose not to pursue remedies. Using survey data from China, I find only one fourth of surveyed workers who experience labor law violations interpret their experiences as labor rights violations, and workers' social relationship with the employers prior to migration explains some of this gap. This essay extends worker grievance research tradition within labor relations by drawing on research from the sociology of law and immigration to understand how these subjective interpretative processes and social identities outside of the workplace influence grievance behaviors.

The second essay investigates whether flexible working time policies reduce the likelihood that individuals leave their employer. Using linked employer-employee data from Germany, I find that by addressing mothers' needs at a critical period in their lives, flexible working time policies encourage women of young children to both remain in the labor force and continue building their careers in a given establishment even in context with extensive state policies that support work-family reconciliation. Further, I find flexible working time policies reduce young workers' likelihood of turnover. It suggests the policies can play an important role in helping young workers develop their human capital and advance their careers.

The third essay studies an international self-regulatory initiative—the SA8000 social responsibility certification—focused on labor standards. Using industrial microdata from China, we find firms that self-regulated exhibited higher average wages than non-adopters even in context without effective surveillance and sanctions. To explain this puzzle, we theorize about self-regulation in pursuit of reputation-sensitive buyers. These buyers privately monitor their suppliers, making up for deficiencies in the broader institutional environment and reducing the expected returns of low-road firms bribing their way into self-regulatory institutions. Consistent with our theory, we find exports increased markedly after adopting self-regulation and domestic sales did not. This essay also provides further specification of the challenges of improving labor standards privately through supply chain standards.

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## Introduction

This dissertation is composed of three essays investigating how *organizational policies* operate within different institutional contexts and in the face of migration, demographic shifts, and globalization. Those essays address ways that organizational policies and practices affect the organizational behavior and welfare of traditionally disadvantaged groups, such as migrants, women, and low-wage workers while also attending to the effectiveness of those policies and practices for firms.

These essays are driven by a broader research agenda that focuses on how workers view their working conditions and the actions they take to address workplace problems. I became interested in worker voice, workplace disputes, and grievance systems in part because of current affairs. China has experienced an increasing number of labor disputes and conflicts in recent years. Despite legislative efforts to address labor concerns, violations of Chinese labor law are rampant among rural-to-urban migrant workers, and the number of labor disputes accepted by the Labor Dispute Arbitration Committee has recently increased by 25 percent annually. These phenomena motivated me to study how migrant workers in China (who move from rural areas to work in urban centers) experience labor law violations and the actions they take to redress their grievances.

In Essay 1, "**Why Don't They Complain? The Social Determinants of Chinese Migrant Workers' Grievance Behaviors"**, I develop and test a theory that workers' subjective evaluation of their experience at work and their social relationships outside of the workplace will influence their grievance behavior. I find that only 25 percent of migrant workers who experienced labor law violations (i.e., who report specific work conditions that are objectively in violation of existing law) subjectively name those experiences as a violation of their rights and

interests. Further, the likelihood that workers recognize those violations is influenced by workers' social identities and relationships with their employers. Specifically, workers who work in organizations where the employer is from the same region are less likely to interpret these labor law violations as a violation of their labor rights and interests. Identifying present conditions as problematic or injurious is a key step before taking action, so measuring the extent of worker grievances by the level of participation in formal dispute resolution procedures erases a large number of unreported cases from the analysis and limits our understanding of workers' experiences.

This work contributes to the worker grievance research tradition within labor relations that has largely ignored the potential role of social relationships *outside* of the workplace in grievance filing and has not attended directly to workers' subjective evaluations of their experiences at work. This gap is particularly problematic in the context of migrant workers in China, who have limited access to information about urban labor markets but carry with them deep regional ties with others from the same (broadly defined) native place when they migrate to cities. While the empirical focus is on China, the theory I develop here may help explain why low-wage immigrant workers in other settings fail to express grievances when confronted with workplace violations.

With a solid understanding of the problems facing today's workforces, I have also identified projects that investigate what firms can do to improve job quality and reduce inequality. My second and third essays explore the possibility for greater incorporation of women into labor markets in developed countries and consider the effectiveness of private regulations in developing countries. Motivated by increases in women's labor force participation and the challenges many women face to balance their work and family lives, the second essay,

"Do Flexible Working Time Arrangements Affect Worker Turnover? Evidence from Linked Employer-Employee Data from Germany," asks whether firm-level flexible working time policies reduce the likelihood that individuals leave their employer. Although there have been numerous studies investigating the relationship between flexible work and worker turnover, existing studies have been dominated by cross-sectional studies that cannot account for unobserved heterogeneity across establishments that may bias estimates. The most compelling evidence in this literature is from case studies and involved relatively short follow-up period. It is not clear whether these findings in a few organizations can be generalized to a broader range of workplaces and workforces, and whether organizational-level flexible working time practices remain relevant for workers in countries with supportive national work-family policies.

To my knowledge, my paper is the first that uses longitudinal, nationally representative data (with panel data on employers' policies and social security administrative records tracking workers' exits from those establishments) and fixed effects analyses to evaluate the effectiveness of such policies. Although it is usually argued that flexible working time arrangements may reduce worker turnover, my research does not find evidence that such policies in fact reduce *overall* worker turnover. However, I find that certain groups of workers are more likely to be retained after establishments adopt such policies. Flexible working time policies reduce the turnover of younger workers (both young men and women) and women with young children. This suggests that providing flexible working time policies is not a panacea for retention of all workers, but those policies can play an important role in helping younger workers develop their human capital. Further, by addressing mothers' needs at a critical period in their life courses, flexible working time policies may reduce the gender pay gap by encouraging women to both

remain in the labor force and continue building their careers in a given establishment even in context with extensive state policies that support work-family reconciliation.

Lastly, my third essay responds to debates about firms' consideration of their environmental and social responsibilities. Concerns about labor rights and environmental sustainability have led to a host of proposed private regulations, involving voluntary commitments by firms or their representative associations to observe standards beyond what is required by law. Are firms that self-regulate in a corrupt context more socially responsible? Alternatively, do irresponsible firms use self-regulation to shield themselves from scrutiny? How do markets respond to self-regulation in this setting? In Essay 3, **"Certified for Success? Self-Regulation of Corporate Responsibility and Market Response in China"** (with Greg Distelhorst and Judith Stroehle), my coauthors and I study an international self-regulatory initiative—the SA8000 social responsibility certification—focused on labor standards in the high-corruption context of China in the mid-2000s. Previous research suggests private regulation is most effective when participating firms are subject to both surveillance and sanctions, and self-regulation in high-corrupt contexts should attract less socially responsible firms. However, studying the SA8000 social responsibility certification in the high-corruption context of mid-2000s China, we find the opposite; firms that self-regulated exhibited higher average wages than non-adopters in the same industry and region. To explain the lack of adverse selection, we theorize self-regulation is a strategy in pursuit of reputation-sensitive buyers. These buyers privately monitor their suppliers, making up for deficiencies in the broader institutional environment and reducing the likelihood of low-road firms bribing their way into self-regulatory institutions.

Exploiting longitudinal industrial microdata, we show that the wage advantage of self-regulators in China was indeed attributable to selection, with no evidence of a causal effect of self-regulation on wages. Consistent with our theory, foreign buyers and domestic buyers respond differently to self-regulation. In both panel estimation and subsamples balanced on levels and trends of pretreatment outcomes, exports increased markedly and domestic sales did not. Finally, pursuit of these buyers appears to pay off; self-regulation is associated with higher rates of firm survival over a four-year period.

Besides our contribution to the private regulation literature, this essay also addresses a debate about the mechanisms of private governance of working conditions in global supply chains and their credibility. We find no evidence that self-regulation caused the average wages of adopters to increase. Social responsibility certifications in China appear primarily to signal preexisting organizational distinctiveness rather than to transform those organizations or improve workers' pay on the ground. This study provides further specification of the challenges of improving labor standards privately through supply chain standards.

In summary, the interdisciplinary training I received at the MIT Sloan School of Management has encouraged me to explore how workers' behaviors, their experiences on the job, and their attainment are shaped by macro-level institutional contexts and meso-level organizational human resource management policies. The three essays in this dissertation illustrate the challenges facing the disadvantaged workers and investigate how innovative human resources policies and initiatives affect both workers' experiences and their capacities to exercise voice and pursue their goals at work.

## Essay 1: Why Don't They Complain? The Social Determinants of Chinese Migrant Workers' Grievance Behavior [1]

### Introduction

The transformation of China's economy from one dominated by state control to that of a mixture of private and state-owned enterprises has been accompanied by increased labor conflict. Between 1995 and 2007, the number of labor disputes accepted by labor dispute arbitration committees (LDACs)—state labor agencies at the municipal and district levels—increased by an average of 25% annually (Gallagher, Giles, Park, and Wang 2015). However, the disputes accepted by LDAC are only the "tip of the iceberg" in regard to the number of labor law violations. This study examines the apparent labor law violations experienced by migrant workers who have rural household registration but have moved to cities for permanent or seasonal non-agricultural employment (hereafter referred to as migrant workers) and the grievance behaviors of this vulnerable population.

Migrant workers make up a large proportion of China's workforce, and most work under conditions that violate its labor law. In 2015, there were approximately 277 million migrant workers, consisting of more than a third of the entire workforce of approximately 770 million in China (National Bureau of Statistics [NBS] of the People's Republic of China 2016). Several indicators suggest that violations of labor law are particularly widespread among migrants. For example, NBS data show that more than 50% of these workers did not have a labor contract in

[1] Originally published in a slightly different form in 2020 as "Why Don't They Complain? The Social Determinants of Chinese Migrant Workers' Grievance Behavior." *Industrial and Labor Relations Review. 73* (2), 366-392. DOI: 10.1177/0019793919872471. Copyright 2019 by Duanyi Yang. Survey data used in this article were collected by the research project titled Protecting Rights of Migrant Workers: Theories and Practices (09JZD0032), sponsored by the Philosophy and Social Science Foundation at the Chinese Ministry of Education and directed by Linping Liu, Nanjing University. I appreciate the support of the institutions and aforementioned individuals for providing data.

every year between 2009 and 2016, in violation of China's Labor Contract Law. Around 85% of migrant workers worked more than 44 hours per week, but few were covered by mandatory social insurance (Table 1). Thus, if all those who experienced labor law violations were to pursue their legal rights, the number of arbitration cases would likely be much higher.

[Table 1 near here]

Given the apparent widespread violations, why do some migrant workers choose not to pursue remedies? Existing studies have largely focused on the formal institutional constraints faced by these workers. Among these are the authoritarian state regime (Lee and Zhang 2013), the limited efficacy of government-controlled labor unions (Friedman and Lee 2010), and the suppression of labor nongovernmental organizations (NGOs) (Fu 2017), which could educate workers on their rights and grievance options. However, less attention has been paid to the influence of informal social rules on workers' perceptions of workplace problems. This article begins by analyzing worker grievances based on their subjective views. It illustrates how the mainstream industrial relations literature on grievance behavior can be extended to incorporate insights from the sociology of law regarding perceptions of workplace injustice and to consider the social identities that migrant workers bring to their work roles.

Using data from a survey of approximately 4,000 migrant workers, this analysis found that despite widespread labor law violations, only 25% percent of those who experienced such violations interpreted their experiences as labor rights and interest violations. This lack of response is attributable in part to the social nature of the employment relationship: When employers and migrant workers are from the same place of origin before migration, workers are more likely to work without a contract. For people who experienced violations, those who have a shared local network with their employers are significantly less likely to acknowledge these violations. These

results reveal the importance of subjective interpretative processes in the study of grievance behavior, and the effects of workers' social relationships and identities outside of work on their responses to workplace problems.

## Existing Theories of Employee Grievances

One central question in the grievance procedure literature asks, under what conditions do employees choose to file grievances? Numerous studies have proposed theories to address this question, all of which focus on factors arising from within or directly related to workplace relationships. The canonical Exit, Voice, and Loyalty model by Albert Hirschman (1970) predicted that employees who are more loyal will opt to stay and voice discontent when they experience it. Freeman and Medoff (1984) applied Hirschman's model and found that unionism reduces turnover and permanent separations and raises job tenure by providing voice options as alternatives to exit.

While the exit, voice, and loyalty model indicates that voice action is associated with improved performance, some studies have revealed negative employee outcomes after grievance filing and settlement. Applying organizational punishment and industrial discipline theory, Lewin (1987) found that grievance filers experienced lower performance ratings and lower promotion rates and higher turnover rates compared to non-filers in non-union organizations. Lewin and his colleagues uncovered similar results in unionized organizations. This finding suggests that loyal employees usually suffer in silence; management retaliation is a major obstacle to employee grievance filing (Boroff and Lewin 1997; Lewin and Peterson 1999).

Motivated by efficiency wage theory in economics, Cappelli and Chauvin (1991) applied an individual rational choice model to examine how labor market factors that determine the availability of alternative jobs affect employees' grievance filing. They found that the pay premium and area unemployment rate were positively correlated with workers' use of grievance

procedures when the cost of using alternative methods (such as shirking or absenteeism) to resolve problems increased. Bacharach and Bamberger (2004) extended Cappelli and Chauvin's framework by investigating the moderating effect of power dependence. They discovered that under the condition of high labor power, the wage premium was positively associated with grievance filing, as predicted by Cappelli and Chauvin (1991). Under the condition of low labor power, however (such as that experienced by Chinese migrant workers), the relationship was largely weakened or reversed.

Other studies of employee grievances have retained this rational cost-effectiveness framework but introduced procedural justice into the grievance model (Lind and Tyler 1988). Employees' positive perception of the speed and fairness of the grievance procedure has shown to increase their use of the grievance system. The focus of these studies is usually on how the interactions between employees' individual characteristics (such as gender, educational level, self-esteem, and competence) and the effectiveness of the system affect filings and turnover (Morrison 2011; Klaas, Olson-Buchanan, and Ward 2012).

This industrial relations research tradition has been fruitful in identifying the roles that employer behavior, law, power, rational choice, and formal institutions play in the filing of grievances. But the tradition has largely ignored the potential role of social relationships *outside* of the workplace and has not attended directly to workers' subjective evaluation of their experiences at work. This gap is particularly problematic in the context of migrant workers in China, who have limited access to information about urban labor markets but carry with them deep regional ties with others from the same (broadly defined) native place when they migrate to cities.

## Social Determinants of Grievances

**Normative Regulation and Informal Control in Local Networks**

The first question this research addresses is whether the shared local identities between workers and employers influence workers' experience of or exposure to Labor Contract Law violations. A well-developed body of sociology research has explored the role of informal local networks but has yet to be applied to the study of workers' grievance behaviors. Normative regulations and informal social control maintain social order (Durkheim [1893] 2014; Scott 2001), in part by publicly monitoring individuals' behavior and administering informal sanctions that might harm their reputation (Galanter 1974).

Research on US immigrant workers has shown that identification with others in the same ethnic enclave or community facilitates an informal economy, and that group norms and informal social control also reduce opportunistic behaviors within enclaves. For example, Portes and Sensenbrenner (1993) illustrated the role of collective identity in the presence of informal loan operations in the Dominican immigrant community of New York City. Within this community, money is made available for start-ups with little or no paperwork. Neighborhood residents ostracize entrepreneurs who fail to repay their loans and so formal processes are not needed.

A similar situation may be playing out among migrants in China, where migration based on place of origin is a well-known phenomenon. Broader than kinship networks, which are usually seen as strong informal social institutions (Greif and Tabellini 2010), local networks develop based on common customs, spoken languages, and social identity. Often, migrants' workplaces are owned by people from the same place of origin. Through local networks, employers hire farmers from their hometown or migrant workers from the same place of origin who are already in the city (Pun and Lu 2010; Swider 2015). Enclaves are thus built upon these ties. Seeking out fellow relatives, provincials, or nationals for employment is an obvious and effective survival strategy

used by Chinese migrant workers as well as many other immigrant workers (Sanders and Nee 1987; Perry 1993; Lee 1998).

Thus, these local enclaves in China may function as substitutes for formal institutions designed to deal with workplace problems. In Fei's book *From the Soil* (1992), he identifies Chinese society as "a society in which the consideration of order, not law, predominates; and in this context, order means each person must uphold the moral obligations of his or her network ties. Otherwise, the entire social system collapses" (p. 24). Although Chinese economic and political systems have significantly changed since Fei originally published his book in 1947, this classic work prompts an investigation of whether the informal social control in these networks affects the implementation of labor law in China today. The power that governs migrant workers' actions and their interpretation of their situation may come less from a top-down authority or the law than from a bottom-up social contract and informal controls in local enclaves.

The first place this effect is likely to be seen is whether or not migrant workers with local network ties to employers are less likely to pursue their right to have a written contract, as required by Labor Contract Law. Because the firm policies related to labor contracts are made by employers, I expect that migrant workers with these shared local ties are less likely to expect or enforce this specific right. Although a central element of Chinese labor law today, a contract may be viewed as unnecessary or inconsistent with informal controls within the community.

H1: All else being equal, migrant workers from the same local network as their employer are more likely to work without a contract.

**Bringing "Naming" to the Grievance Model: Shared Local Identity and Workers' Subjective Evaluation of Violations**

The second question to be addressed is whether workers in fact *view* work conditions that officially violate the relevant labor law as *violations of their rights and interests*. In general, the standard grievance literature fails to distinguish between workers who have and have not *recognized* unfair treatment at work; the few exceptions include Olson-Buchanan and Boswell (2008), who introduce a sense-making perspective to the grievance model. In other words, the literature largely focuses on the grievance procedure structure and neglects the role played by worker subjectivity and agency—that is, the way in which workers interpret problems experienced at work. Empirically, previous studies have explained the variation of grievance filing with regard to either all employees or only those who perceived themselves to have experienced unfair treatment (Boroff and Lewin 1997). The interpretation of grievances, however, is usually neglected.

This gap in the grievance procedure literature can be filled by theories from the sociology of law, in which a "dispute pyramid" metaphor is used to model the dispute transformation process of "naming, blaming, and claiming" (Felstiner, Abel, and Sarat 1980; Albiston, Edelman, and Milligan 2014). This literature recognizes that many workers face problematic conditions but that only some of them (moving up the pyramid) recognize an injury, blame the other party for their wrongdoing, and seek legal remedy. This theory is the basis of the idea that lawsuits and other legal proceedings represent "the tip of the iceberg" in capturing problematic and officially illegal experiences.

Although the law provides individuals with a powerful set of interpretative tools in naming an action as wrong, ordinary people do not simply interpret the law as official texts that embody formal legal rules and institutions (Ewick and Silbey 1998). Rather, workers hold normative perspectives of what constitutes acceptable managerial ethics. Their interpretations are influenced by the norms embedded in their social groups, such as the kinship network, religious groups,

voluntary associations, and local enclaves (Felstiner 1974; Ellickson 1991). When workers experience apparent violations, those who share an identity with their employers or supervisors may be less likely to name such violations as a problem to be remedied.

Another branch of research influenced by the labor process tradition suggests that workers may not name labor law violations as an infringement of their rights because of the hegemonic power in shared local networks. Workers may feel—and be expected to express—gratitude to those in their network who hire or introduce them into the workplace. In recent years, labor process theories have been extended to worker subjectivity and identity (Alvesson and Willmott 2002; Thompson and O'Doherty 2011). Shared local identity between employers and workers as well as between supervisors and workers may create "relation-based hegemony," which not only generates trust and loyalty but also creates consent and diminishes workers' dissatisfaction. Workers feel morally pressured to not acknowledge their legal rights when they work for employers or under the supervision of those from their local networks (Shen 2007; Cai and Jia 2009). In a detailed case study of a Hong Kong factory in which kinship ties were extensively used in recruitment, Smart and Smart (1993) found that workers who became obligated through asymmetrical reciprocity were required to work beyond the official requirements of their job description. Extending this finding, the current analysis hypothesizes that people with a local tie to their employer or supervisor may be less likely to name labor law violations as a violation of their rights and interests, since doing so would challenge the social expectation of gratitude and compliance.

> H2a: All else being equal, among those who experienced labor law violations, migrant workers who are from the same local network as their employers are less likely to name labor law violations as violations of their rights and interests.

H2b: All else being equal, among those who experienced labor law violations, migrant workers who are from the same local network as their supervisors are less likely to name labor law violations as violations of their rights and interests.

**Embedded Loyalty and Solidarity: When Discontent Turns into Action**

At the stage of claiming or taking action, the exit, voice, and loyalty model (Hirschman 1970) is useful to explain the behavior of workers who have already perceived violations. To protect the public reputation of employers or supervisors from the same home location, workers may be more loyal–willing to spend extra energy on voicing their opinions through organizational grievance channels than to bring their case to governmental agencies or courts or to simply quit. Much of the early work in the sociology of law literature examined the likelihood that individuals would use the formal legal system rather than alternative means of dispute resolution. Researchers have suggested that those who share social networks are more likely to use non-legal channels, rather than the courts, to resolve disputes (Nader and Todd 1978). Additionally, among workers who have named violations, those with a shared local network may be more likely to have solvable problems that they believe can and perhaps will be addressed by management. Therefore, I expect that people who share a local network with their employers or supervisors are more likely to use organizational grievance channels to redress their grievances.

H3a: All else being equal, among people who named labor law violations, migrant workers from the same local network as their employers are more likely to use internal grievance channels.

H3b: All else being equal, among people who named labor law violations, migrant workers from the same local network as their supervisors are more likely to use internal grievance channels.

Workers' social relationships with their coworkers may also facilitate their use of grievance channels. Resource mobilization theory (Zald and McCarthy 1979) suggests that coworkers' shared local networks are crucial resources that provide important information about legal rights and grievances. Moreover, social identity theory predicts that workers' perception of negative group status motivates activities to improve their group status through mobilizations (Tajfel and Turner 1986; Polletta and Jasper 2001). Thus, workers' local enclaves may create bounded solidarity that promotes both individual grievance filing and collective actions (Klandermans, Van der Toorn, and Van Stekelenburg 2008; Becker 2012).

This analysis cannot test whether informal local ties can facilitate the use of external dispute resolution options, such as taking the employer to court, or collective actions, such as strikes, because these cases are extremely rare. Instead, the focus is on investigating whether social relationships among workers outside of the workplace increase the probability of recognizing law violations and predict greater use of organizational grievance channels.

H4a: All else being equal, among those who experienced labor law violations, migrant workers with greater local peer network density at workplaces are more likely to name labor law violations as violations of their rights and interests.

H4b: All else being equal, among those who named labor violations, workers with greater local peer network density at workplaces are more likely to use internal grievance channels.

## Data and Measurements

## Data

To test the hypotheses, primary data were gathered from a survey of approximately 4,000 migrant workers in nine cities in the Pearl River Delta (PRD) and 10 cities in the Yangzi River Delta (YRD). PRD and YRD are the top two mega-regions of China, hosting 43% (109 million) of the country's migrant workers (NBS 2012). The survey was conducted in July and August 2010 by the Center for Social Survey at Sun Yat-Sen University.[2]

Because a sampling frame (i.e., a list of all members in the population) does not exist for this highly mobile population, the survey uses nonprobability sampling. The nonprobability survey purposively selects respondents to obtain the desired sample composition while data are being collected. This process was achieved through quotas, for which the researchers pre-specified a particular distribution across location, gender, and industry based on census data.[3] First, the 19 cities were given quotas based on their estimated share of migrant workers. Second, within each city, quotas were established by gender and industry, again based on census data. Third, the survey imposed a maximum of one worker from firms with less than 30 employees, three workers from firms with 30 to 299 employees, and five workers from firms with more than 300 employees. Multiple workers surveyed from one firm were selected to capture variation in gender, occupation, age, or place of origin.

[2] The nine cities in PRD include Guangzhou, Shenzhen, Zhuhai, Foshan, Zhaoqing, Dongguan, Huizhou, Zhongshan, and Jiangmen. The 10 cities in YRD are Shanghai, Nanjing, Suzhou, Wuxi, Changzhou, Nantong, Hangzhou, Nignbo, Jiaxing, and Shaoxing. Migrant workers completed the questionnaires; undergraduate and graduate student research assistants provided assistance to less-educated workers. To prevent students from filling out the questionnaires themselves, a few attention questions were included. In addition, respondents were asked to leave their phone numbers. If the survey administrator questioned the reliability of the survey, they called the respondents to verify the validity of the survey and discarded unverified questionnaires.

[3] Census data information was obtained from the 2007 Shanghai Statistical Yearbook and the China 1% National Population Sample Survey 2005.

Respondents were found on the street near factories and were screened to choose those who worked full time without urban household registration (*hukou*) or four-year college degrees. Although the survey did not use pure random sampling, it is the most comprehensive and representative survey available to answer the research questions on migrant workers' experiences of and responses to labor law violations.

## Dependent Variables

### *Experiencing Violations*

The survey asked respondents about their objective employment conditions in the current firm before inquiring about their subjective evaluations of their work experiences. The study grouped experiences that would seem to violate labor law into six categories: no contract, no social insurance, overtime violations, wage violations, occupation safety and health (OSH) violations, and forced labor. The definition and coding strategy of these variables are described in Appendix Table A.1. These variables measure apparent labor law violations, without assessing whether the workers themselves acknowledge those situations as problematic or injurious.[4]

### *Naming and Blaming*

After the respondents reported their experiences of law violations, they were asked about their evaluation and attribution of the wrong. Naming and blaming was operationalized based on the following survey question: "Since August 2009, have you ever felt negatively (*you yijian*) about

[4] Although other types of violations should reflect the objective working conditions workers experienced, OSH violations should be interpreted with caution. Different workers may have had different understandings about what constitutes hazardous and unprotected conditions in the workplace. Workers' reports about OSH violations were also likely to be affected by their relationship with, and feelings about, employers and supervisors.

labor rights and interests (*laodong quanyi*) toward your current firm?" Naming and blaming was coded as 1 if the worker answered yes to this question, and 0 otherwise.[5]

***Grievance Filing (Claiming)***

Respondents who acknowledged illegal practices (i.e., naming and blaming = 1) were asked whether they had expressed grievances to the management in the past year. Among the organizational grievance channels were 1) a suggestion box, 2) a hotline, 3) an in-house grievance office, 4) a focus group within the firm, 5) a conversation with management and/or a supervisor, 6) an attempt to arrive at a solution with the employer, 7) an enterprise labor union, and 8) an employee work council. Grievance filing was coded as a dummy variable equal to 1 if employees expressed all or part of their grievances to the management using any of these grievance channels, and 0 otherwise.

**Focal Independent Variables**

I measured the presence of a shared employer-worker local network with the following survey question: "Does your current employer come from the same province as yourself?" Employer-worker province network equaled 1 if the respondent answered yes to this question, and 0 otherwise. I constructed employer-worker city network and employer-worker village network variables based on similar questions about workers' city and village. Results are described in the original study and are available upon request.

[5] The naming and blaming rate may be overestimated for two reasons. First, the survey process may have elicited workers' recollection of their legal rights. Second, *quanyi* means rights and interests, which is a broader notion than workers' legal rights. Naming and blaming interest-related issues rather than labor law violations might inflate the rate. These two potential sources of bias, however, are likely to be independent of workers' social relationship with their employers, supervisors, and coworkers.

Supervisor-worker network is a dummy variable that equals 1 if workers are from the same province with their supervisors, and 0 otherwise. Alternative supervisor-worker city network and supervisor-worker village network analyses are available upon request.

Peer network density equals 0 if none of the coworkers are reported (by the respondent) to be from the same province as the respondent, 1 if less than 10%, 2 if 10 to 19%, 3 if 20 to 29%, 4 if 30 to 49%, and 5 if 50 % or more of the coworkers are from the respondent's province.

### Control Variables

In the analysis I controlled for workers' individual characteristics and their firms' characteristics that may correlate with workers' experience of violation and their naming and grievance filing behaviors. The definition and coding strategy of key control variables are described in Appendix Table A.2.

## Analysis

### Descriptive Statistics

Figure 1 shows the prevalence of labor law violations experienced by migrant workers and the gap between the laws on the books and migrant workers' subjective evaluations of their experiences. A total of 86% of the workers in the survey had experienced one or more types of apparent labor law violations at their current firms. Yet only 22% indicated that they had felt negatively toward their employer with regard to labor rights and interests (i.e., naming and blaming = 1), and only 14% had used organizational grievance channels. These results demonstrate the value of using the dispute pyramid to model these different stages of grievance behavior in Chinese workplaces.

[Figure 1 near here]

Table 2 demonstrates how migrant workers' experience with and interpretation of labor law violations vary by the type of problem they encounter and their shared social relationships with their employers and supervisors. It reports descriptive statistics for key dependent variables (experiencing violations, naming and blaming, and claiming) by workers' shared provincial local network with their employers and supervisors.

Table 2 shows that in the full sample, social insurance had the highest rate of violation (68.5%), followed by overtime (36.6%), lack of contract (31.4%), wage violations (18.6%), forced labor (18.8%), and OSH violations (15.5%). The high rate of social insurance law violations appeared to be tied to the structure of the pension system. Employers contribute 20% of a worker's wage to the regional social pool under the Pay-as-You-Go system, and workers contribute 8% of their own wage to the personal pool under the Funded System. After 15 years or more, workers receive pensions from both systems. Pensions are not managed as a national integrated system but instead through regional pooling systems. If migrant workers move to another region or return home, only their contributions to the personal pool can be cashed out (Williamson and Deitelbaum 2005; Gao, Yang, and Li 2012). Therefore, those who do not have long-term plans to stay in a given city have strong incentives to forgo the social insurance requirement (or to ignore violations of this law). For many migrant workers, complying with social insurance legal mandates contradicts their short-term economic interests.

The high rate of hour violations also supported findings in the existing literature that migrant workers generally express an interest in working overtime. In practice, most migrant workers live under extreme economic scarcity and focus on the total amount of wages received at the end of the month, without paying attention to the laws for maximum hours (Chung 2015; Franceschini, Siu, and Chan 2016).

Concerning Hypothesis 1, the bivariate tests in Table 2 show that workers from the same province as their employer were significantly more likely to experience contract and social insurance violations ($p < 0.01$), as well as wage violations ($p < 0.05$), but less likely to experience hour, occupational health and safety, and forced labor violations ($p < 0.01$). Workers from the same province as their supervisors were also significantly more likely to experience contract and social insurance violations but less likely to experience forced labor.

Turning to workers' subjective evaluations of and actions toward illegal practices, the "naming and blaming" rate is highest for those who experienced OSH violations (42.3%), followed by forced labor (36.8%), wage violations (36.5%), hour violations (28.2%), social insurance violations (24.6%), and contract violations (23.4%). Concerning Hypothesis 2a, the bivariate tests show that when they experienced violations, workers from the same province as their employers were significantly less likely to name all violations. (Alternative specifications with shared city and village ties to the employer show similar results.) However, the naming and blaming rate does not differ by shared supervisor-worker local network. Hypothesis 2b is not supported. Migrant workers were less likely to name a violation or blame the employer when they shared a local tie, but the supervisor's home location was not associated with naming and blaming.

The bivariate test provides support for Hypothesis 3a. Among workers who "named" a problem with their employers' labor practices, workers from the same province, city, and village (although the latter two are not shown in the table) as their employers were significantly more likely to use organizational grievance channels, including direct communication with the management, to resolve the problem. However, this bivariate test does not support Hypothesis 3b. Workers' grievance filing rate did not differ for those who did or did not share a local network with their supervisors.

[Table 2 near here]

It is important to note that grievance procedures in Chinese firms, especially those that are private, are extremely weak and informal (Liu 2014). The most frequently used grievance channels were having a conversation with a supervisor (42.7%) and seeking solutions with the employer (36.65%). Migrant workers rarely used the more formal internal grievance procedures, such as turning to a labor union or an in-house grievance office (Figure 2).[6] This finding is similar to the grievance filing pattern in the United States, where most employment relationship conflicts do not result in the filing of written grievances (Kochan, Yang, Kimball, and Kelly 2019). For example, a study of unionized grievance procedures estimated that for every one grievance settled through the formal grievance procedure, approximately 12 grievances were settled informally through discussions with peers, supervisors, and managers (Lewin and Peterson 1988).

[Figure 2 near here]

For workers who used the internal grievance channels, the survey asked about which issues were involved; multiple answers were allowed. Figure 3 shows that among workers who used internal channels, the vast majority reported issues related to wages (74.42%). These channels were also used to report issues regarding occupational safety and health (31.44%), hours (28.77%), management practices (24.33%), social insurance (12.97%), and labor contract (9.41%).

[Figure 3 near here]

[6] I define formal grievance channels as turning to unions, works council, and in-house grievance offices. Other channels, such as hotlines and suggestion boxes, are counted as informal grievance channels. Because multiple answers were allowed in the grievance channel question, among workers who had used grievance channels, 81% used only informal channels, 11% used both formal and informal channels, and 7% used only formal channels.

**Regression Results**

Table 3 includes regression results pertaining to Hypothesis 1. I estimate a logit model predicting the likelihood that workers would experience contract-related violations (M1), social insurance violations (M2), wages violations (M3), working hours violations (M4), safety and health violations (M5), and forced labor (M6).

As shown in models 1 (M1), M5, and M6, holding other variables constant, sharing a provincial local network with the employer increases the log odds of working without a contract by 0.85 ($p < 0.01$), and decreases the log odds of experiencing OSH and forced labor violations by 0.35 and 0.4, respectively ($p < 0.05$). These results offer support for Hypothesis 1. In addition, no effect emerged of a shared employer-worker network with regard to wages, hours, or social insurance violations.[7]

As for the control variables, female workers are less likely to experience violations regarding social insurance and OSH, whereas older workers are less likely to experience forced labor. I re-ran models 1 to 6 using *Post80* as an alternative measure of age. The log odds of experiencing forced labor is 0.25 ($p < 0.05$) higher for workers born after 1980, but this cohort indicator is not significantly related to experiencing contract, insurance, hour, wage, and OSH violations. Workers with higher levels of education and legal knowledge are less vulnerable to most types of violations. At the firm level, workers employed in a firm or community with a union are less likely to experience contract and social insurance violations, which suggests that the quasi-governmental unions have some administrative power to enforce those laws. Workers

[7] H1 is supported using city and village networks as alternative independent variables. Holding other variables constant, sharing a city and village network with the employer increased the log odds of working without a contract by 0.95 and 0.92, respectively ($p < 0.01$).

who were in a firm or community that had one or more civil society organizations are less likely to experience overtime and forced labor.

Compared to workers in state-owned enterprises (SOEs), those in domestic private enterprises (DPE) are more likely to work without contracts and social insurance and to experience hours violations. Workers in foreign-owned enterprises are more likely to experience hours violation but less likely to encounter wage and labor contract violations than those employed by SOEs. Surprisingly, the latter workers were more likely to be subjected to forced labor. To further probe the problem, I ran regressions using the two subcategories of forced labor (*physical abuse* and *deposit*) as dependent variables (results are not presented in tables). Workers in SOEs are more likely to pay money deposits or have their credentials detained than to experience physical abuse. Although workers in larger firms are less vulnerable to informal employment, social insurance, and wage violations, they are more likely to experience hours violations.

[Table 3 near here]

To assess Hypothesis 2a, in Table 4, I estimate logit models to predict the likelihood of naming and blaming among workers who experienced any type of labor law violation (M7), as well as, specifically, contract violations (M8), social insurance violations (M9), wage violations (M10), hours violations (M11), OSH violations (M12), and forced labor (M13). Holding other variables constant, among respondents who experienced apparent violation(s), sharing a provincial local network with the employer decreases the log odds of naming (M7) by 0.45 ($p < 0.01$). This negative association between shared employer-worker local networks and naming labor law violations holds for workers who experienced all types of violations, except hours violations and forced labor. Using city and village network as key independent variables, respectively, the

analysis reveals that sharing the same city as the employer decreases the log odds of naming and blaming violations by 0.8 ($p < 0.01$), and that sharing a village with the employer decreases the same odds by 0.7 ($p < 0.01$). These results are consistent with the findings presented in Table 4 for provincial ties with the employer. In contrast to Hypothesis 2b, shared supervisor-worker province, city, or village network is not significantly associated with naming and blaming.

Concerning Hypothesis 4a, workers' local peer network density at their current workplaces is positively associated with naming and blaming among people who experienced forced labor only; it is not a significant predictor of naming and blaming when workers experienced other types of labor law violations.

Another important finding in Table 4 is that women who experienced social insurance violations and forced labor are significantly less likely to name the violations than are their male counterparts. This finding supports ethnographic evidence that the willingness to cooperate and accept mistreatment differs among women and men, and that gender identities play a central explanatory role in accounting for production politics (Lee 1998). In addition, workers who have higher levels of education are more likely to name labor violations, and having a wage premium in the current firm is negatively correlated with workers' naming of labor law violations. When experiencing contract or wage violations, workers in communities with civil society organizations are more likely to name violations. Age, measured as either a continuous variable or dummy variable, is also not a significant predictor of naming labor law violations, challenging the thesis that the new generation of migrant workers have greater rights consciousness.

[Table 4 near here]

Table 5 shows the effects of local networks on workers' grievance filing behaviors. Because only people who named violations answered the question about grievance filing, those

who did not were excluded from this part of the analysis. In contrast to the findings regarding Hypothesis 3, a shared employer-worker provincial network does not predict workers' use of grievance filing channels (M14), nor does a supervisor-worker shared provincial network (M17). Yet, using city and village employer-worker network as key independent variables, respectively, reveals some evidence that sharing a city tied with the employer increases the log odds of grievance filing by 0.97 ($p < 0.1$, M15). The village tie to the employer increased the log odds of grievance filing by 0.76 (M16). The coefficient, however, is not statistically significant, perhaps because only 22 of those naming violations had a shared village network with their employers. Coming from the same village would suggest greater cultural and social affinity, so this hypothesis is worth investigating further.

Concerning Hypothesis 4b, no significant effects emerge of peer network density on workers' grievance filing. Another interesting question is whether peer network density is associated with workers' collective actions (such as a protest or strike). However, less than 3% of survey respondents indicated having participated in collective actions during the past year. This sample size is too small to test, but future work should investigate this hypothesis.

Among those who named violations, workers with greater knowledge of the labor law and other laws and regulations were more likely to use grievance channels. Similar to the results uncovered at the stage of naming and blaming, I find no age effect (using both continuous and dummy age variable). A strong gender effect, however, did emerge regarding grievance filing: Women are significantly less likely to use organizational grievance channels than men are ($p < 0.01$). The underlying factors that may shape women's perception of labor law violations and their grievance filing behavior deserve further investigation. Finally, union existence fails to predict grievance filing. At the same time, however, those who worked in communities with civil

society organizations are more likely to use organizational grievance channels ($p < 0.1$). This result supports findings on the potential mobilizing power of civil society organizations (Gleeson 2009).

[Table 5 near here]

## Conclusion and Future Research Agenda

Despite recent legislative efforts to address labor concerns, violations of Chinese labor law are rampant among rural-to-urban migrant workers. One important reason for the weak enforcement of labor law is that migrant workers do not pursue possible cases through formal or legal channels. Using data on Chinese migrant workers' grievance behaviors, this article makes two contributions to the employee grievance literature. First, by building the subjective interpretation process into the theoretical models of grievances, I find that only 25% of migrant workers who experienced labor law violations subjectively named the experience as a violation of their rights and interests. Identifying present conditions as problematic or injurious is a key step before taking action. Therefore, limiting worker grievance to formal dispute resolution procedures erases a large number of unreported cases and hampers our understanding of workers' experiences.

Second, I find that the likelihood of experiencing and naming and blaming violations are influenced by workers' social identities and relationships with their employers. A shared local network between the employer and worker was positively associated with contract violation, suggesting that the informal social control mechanisms in local networks relieved workers' felt need for a contract. Those who shared a local network with their employer are significantly less likely to recognize (name and blame) labor law violations than were their counterparts. A shared tie with the employer appears to be key; supervisor-worker shared local networks and working with more coworkers from the same home location fails to predict workers' recognition of violations or grievance filing.

The article also makes empirical contributions to the literature on labor rights in China, which has largely been based on ethnography and limited to case studies. Much of the research has focused on strikes and other forms of extra-legal action, but the findings of this study suggest the prevalence of unreported labor law violations. If all those working in conditions that are not compliant with legal requirements were to pursue their rights through legal or extra-legal actions, the number of arbitration cases and collective actions would likely be much higher. In addition, the limited effects of age on experiences with, recognition of, and reactions to labor law violations offer an important supplement to the youth empowerment literature (Franceschini, Siu, and Chan 2016; Lee 2016), which has focused primarily on collective actions. The findings on gender and civil society organizations, while perhaps not surprising, provide important evidence on the role of gender and voluntary associations in accounting for grievance behaviors.

The generalizability of the results presented in this article need to be investigated in future work on contemporary China and elsewhere. The findings on migrant workers' experience of labor law violations may still be highly valid today, as the national rate of most types of these violations has barely changed (Table 1). It remains an open question, however, of whether workers' recognition and response to labor law violations have changed since the survey used in this research was conducted. In addition, because of the unbalanced development of labor NGOs and regional union reforms across China, future work should investigate whether the naming, blaming, and grievance filing rates differ across geographic areas. Additionally, the sampled cities used in this research receive the largest number of migrants from all over the country. Given their great number, it is possible that sharing a place of origin with the employer would be more relevant in these socially heterogeneous environments. Whether the network effects still hold in provinces that receive a larger share of rural workers within the province also deserves attention in future

work. More broadly, an expanded grievance model that considers subjective interpretations as well as grievance actions, and that considers non-work social relationships, needs to be applied in settings outside of China, including in future research on immigrant and migrant workers in a variety of economies.

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## Figures

**Figure 1. Number of Migrant Workers Who Experience Violations, Name and Blaming Violation, and File Grievances**

**Figure 2. Use Rate of Internal Grievance Channels**

**(Unit: percentage; multiple answers allowed; *N* = 562)**

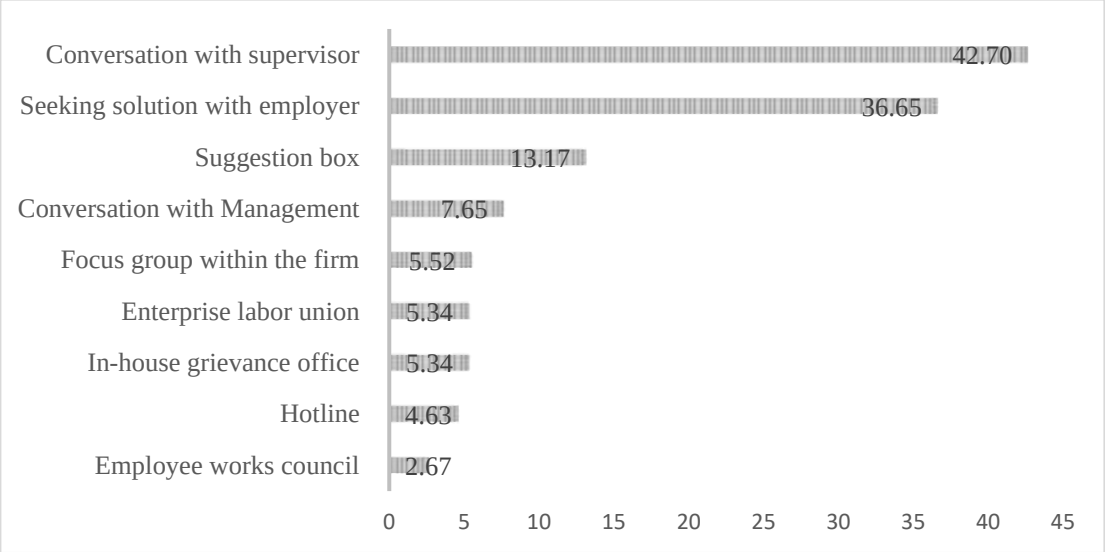
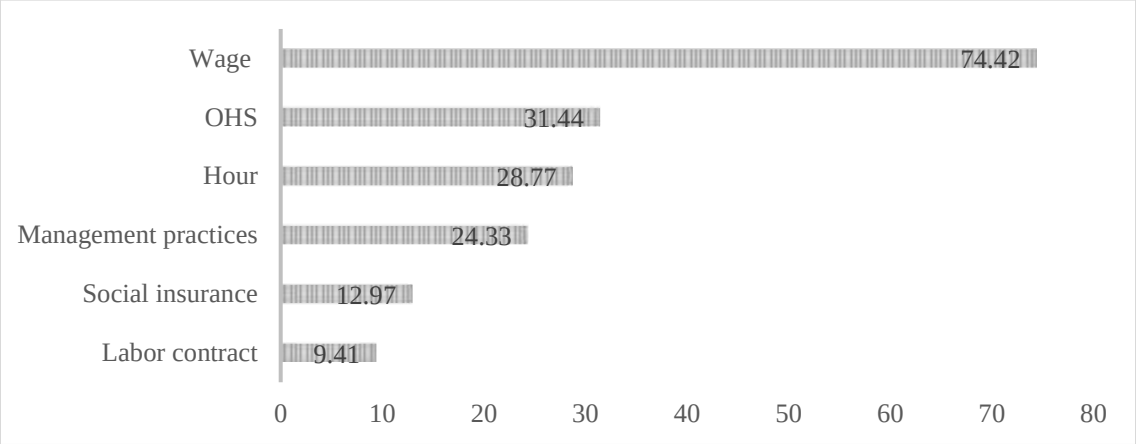


**Figure 3. Internal Grievance Filing Issues**

**(Unit: percentage, multiple answers allowed; *N* = 563)**



## Tables

**Table 1. National Statistics on Labor Standards of Chinese Migrant Workers (%)**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|
| Contract coverage | — | 42.8 | 42 | 43.8 | 43.9 | 41.3 | 38 | 36.2 | 35.1 |
| Overtime (> 44 hours/week) | — | 89.8 | 90.7 | 84.5 | 84.4 | 84.7 | 85.4 | 85 | 84.4 |
| Pension insurance coverage | 9.8 | 7.6 | 9.5 | 13.9 | 14.3 | 15.7 | 16.7 | — | — |
| Work injury insurance coverage | 24.1 | 21.8 | 24.1 | 23.6 | 24 | 28.5 | 26.2 | — | — |
| Medical insurance coverage | 13.1 | 12.2 | 14.3 | 16.7 | 16.9 | 17.6 | 17.6 | — | — |
| Unemployment insurance coverage | 3.7 | 3.9 | 4.9 | 8 | 8.4 | 9.1 | 10.5 | — | — |
| Maternity insurance coverage | 2 | 2. | 2.9 | 5.6 | 6.1 | 6.6 | 7.8 | — | — |

*Source:* National Bureau of Statistics of the People's Republic of China (2010, 2012, 2013, 2014, 2015, 2016, 2017).

**Table 2. Descriptive Statistics for Key Dependent Variables: All Workers, With and Without Shared Province Network**

| | All workers | | Without employer-worker network | | With employer-worker network | | Diff. | Without supervisor-worker network | | With supervisor-worker network | | Diff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | Mean | *N* | Mean | *N* | Mean | | *N* | Mean | *N* | Mean | |
| Experiencing violations (full sample) | | | | | | | | | | | | |
| Any violation | 3,915 | 0.861 | 3,450 | 0.858 | 465 | 0.888 | * | 3,172 | 0.853 | 743 | 0.898 | *** |
| | | (0.35) | | (0.35) | | (0.32) | | | (0.35) | | (0.30) | |
| No contract | 3,915 | 0.314 | 3,450 | 0.285 | 465 | 0.527 | *** | 3,172 | 0.291 | 743 | 0.412 | *** |
| | | (0.46) | | (0.45) | | (0.50) | | | (0.45) | | (0.49) | |
| No social insurance | 3,915 | 0.685 | 3,450 | 0.678 | 465 | 0.735 | *** | 3,172 | 0.673 | 743 | 0.732 | *** |
| | | (0.47) | | (0.47) | | (0.44) | | | (0.47) | | (0.44) | |
| Wage violation | 3,915 | 0.186 | 3,450 | 0.181 | 465 | 0.228 | ** | 3,172 | 0.185 | 743 | 0.192 | |
| | | (0.39) | | (0.39) | | (0.42) | | | (0.39) | | (0.40) | |
| Overtime | 3,915 | 0.366 | 3,450 | 0.374 | 465 | 0.308 | *** | 3,172 | 0.364 | 743 | 0.374 | |
| | | (0.48) | | (0.48) | | (0.46) | | | (0.48) | | (0.48) | |
| OSH | 3,915 | 0.155 | 3,450 | 0.161 | 465 | 0.114 | *** | 3,172 | 0.15 | 743 | 0.178 | * |
| | | (0.36) | | (0.37) | | (0.32) | | | (0.36) | | (0.38) | |
| Forced labor | 3,915 | 0.188 | 3,450 | 0.196 | 465 | 0.131 | *** | 3,172 | 0.194 | 743 | 0.163 | ** |
| | | (0.39) | | (0.40) | | (0.34) | | | (0.40) | | (0.37) | |
| Naming and Blaming (among workers who experience the following violations) | | | | | | | | | | | | |
| Any violation | 3,372 | 0.245 | 2,959 | 0.256 | 413 | 0.167 | *** | 2,705 | 0.249 | 667 | 0.231 | |
| | | (0.43) | | (0.44) | | (0.37) | | | (0.43) | | (0.42) | |
| No contract | 1,228 | 0.234 | 983 | 0.255 | 245 | 0.147 | *** | 922 | 0.242 | 306 | 0.209 | |
| | | (0.42) | | (0.44) | | (0.36) | | | (0.43) | | (0.41) | |
| No social insurance | 2,680 | 0.246 | 2,338 | 0.259 | 342 | 0.158 | *** | 2,136 | 0.25 | 544 | 0.228 | |
| | | (0.43) | | (0.44) | | (0.37) | | | (0.43) | | (0.42) | |
| Wage violation | 729 | 0.365 | 623 | 0.385 | 106 | 0.245 | *** | 586 | 0.381 | 143 | 0.301 | |
| | | (0.48) | | (0.49) | | (0.43) | | | (0.49) | | (0.46) | |
| Overtime | 1,433 | 0.282 | 1,290 | 0.289 | 143 | 0.217 | *** | 1,155 | 0.292 | 278 | 0.241 | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (0.45) | | (0.45) | | (0.41) | | | (0.46) | | (0.43) |
| OSH | 608 | 0.423 | 555 | 0.441 | 53 | 0.226 | *** | 476 | 0.431 | 132 | 0.394 |
| | | (0.49) | | (0.50) | | (0.42) | | | (0.50) | | (0.49) |
| Forced labor | 736 | 0.368 | 675 | 0.369 | 61 | 0.361 | *** | 615 | 0.358 | 121 | 0.421 |
| | | (0.48) | | (0.48) | | (0.48) | | | (0.48) | | (0.50) |
| Grievance filing (among workers who experience and name violations) | | | | | | | | | | | |
| Any violation | 827 | 0.647 | 758 | 0.636 | 69 | 0.768 | ** | 673 | 0.64 | 154 | 0.675 |
| | | (0.48) | | (0.48) | | (0.43) | | | (0.48) | | (0.47) |

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. Standard deviations in parentheses.

**Table 3. Logit Models Predicting Experiencing Labor Law Violations**

| | M1 | M2 | M3 | M4 | M5 | M6 |
|---|---|---|---|---|---|---|
| | No contract | No insurance | Wage violation | Overtime | OSH | Forced labor |
| Province employer-worker network | 0.847*** | 0.152 | 0.174 | 0.032 | -0.352** | -0.401** |
| | (0.13) | (0.14) | (0.14) | (0.12) | (0.17) | (0.16) |
| Female | -0.014 | -0.277*** | -0.027 | -0.115 | -0.714*** | -0.148 |
| | (0.10) | (0.09) | (0.10) | (0.09) | (0.11) | (0.10) |
| Married | -0.139 | 0.074 | -0.267** | -0.129 | -0.239* | -0.150 |
| | (0.12) | (0.12) | (0.12) | (0.10) | (0.13) | (0.12) |
| Age | 0.005 | 0.002 | 0.000 | 0.000 | -0.009 | -0.0256*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| Education (ref. primary school or lower) | | | | | | |
| Middle school | -0.129 | -0.112 | -0.151 | -0.142 | -0.035 | -0.035 |
| | (0.12) | (0.14) | (0.13) | (0.12) | (0.14) | (0.14) |
| High school or equivalent | -0.276* | -0.620*** | -0.212 | -0.374*** | -0.184 | 0.015 |
| | (0.15) | (0.15) | (0.15) | (0.14) | (0.17) | (0.16) |
| Vocational school or higher | -0.841*** | -1.032*** | 0.392** | -0.890*** | -0.523** | -0.308 |
| | (0.20) | (0.18) | (0.18) | (0.17) | (0.24) | (0.20) |
| Legal knowledge | -0.0442*** | -0.0255*** | -0.0314*** | -0.003 | -0.0364*** | -0.0280*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| Tenure | -0.0576*** | -0.0429*** | -0.019 | -0.0355*** | -0.017 | 0.0325*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| Wage premium (1000 yuan) | -0.045 | -0.014 | 0.013 | 0.038 | -0.059 | -0.112** |
| | (0.04) | (0.03) | (0.03) | (0.03) | (0.04) | (0.05) |
| Union | -1.352*** | -0.444*** | 0.001 | -0.129 | 0.040 | -0.114 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (0.18) | (0.11) | (0.14) | (0.11) | (0.15) | (0.13) |
| Civil society | -0.096 | -0.176 | -0.088 | -0.402** | -0.376 | -0.617** |
| | (0.29) | (0.18) | (0.23) | (0.20) | (0.28) | (0.26) |
| Local worker | 0.481* | -0.292 | -0.021 | 0.129 | 0.303 | -0.315 |
| | (0.28) | (0.25) | (0.29) | (0.27) | (0.36) | (0.30) |
| Firm ownership (ref. SOEs) | | | | | | |
| DPEs | 0.672*** | 0.382*** | 0.193 | 0.408*** | 0.009 | -0.322** |
| | (0.17) | (0.14) | (0.16) | (0.15) | (0.19) | (0.15) |
| HMTs | -0.100 | 0.247 | -0.309 | 0.628*** | 0.04 | -0.410** |
| | (0.24) | (0.18) | (0.22) | (0.17) | (0.23) | (0.20) |
| FIEs | -0.510* | -0.275 | -0.576** | 0.557*** | -0.367 | -0.477** |
| | (0.31) | (0.19) | (0.26) | (0.19) | (0.27) | (0.22) |
| Firm size (ref. < 100 employees) | | | | | | |
| 100–299 employees | -0.898*** | -0.471*** | 0.074 | 0.231** | -0.056 | 0.148 |
| | (0.11) | (0.12) | (0.12) | (0.10) | (0.13) | (0.12) |
| 300–999 employees | -1.440*** | -0.679*** | -0.246* | 0.514*** | -0.170 | 0.524*** |
| | (0.13) | (0.12) | (0.13) | (0.11) | (0.15) | (0.13) |
| > 1000 employees | -2.015*** | -0.896*** | -0.419*** | 0.674*** | -0.164 | 0.203 |
| | (0.14) | (0.12) | (0.14) | (0.11) | (0.15) | (0.13) |
| Constant | 1.773 | 1.990** | -2.424* | -2.179* | -0.101 | -0.170 |
| | (1.18) | (0.96) | (1.34) | (1.21) | (1.24) | (0.96) |
| Observations | 3,905 | 3,905 | 3,902 | 3,910 | 3,893 | 3,905 |

*Notes:* Robust standard errors in parentheses. All models control for industry, job types, province of origin dummies, and city dummies. DPE, domestic private enterprise; FIE, foreign-invested enterprises; HME, Hong Kong, Macao, and Taiwan firms; SOE, state-owned enterprises.* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

**Table 4. Logit Models Predicting Naming and Blaming among People Who Experience Violations**

| | M7 | M8 | M9 | M10 | M11 | M12 | M13 |
|---|---|---|---|---|---|---|---|
| | Any violation | No contract | No insurance | Wage violations | Overtime | OSH | Forced labor |
| Province employer-worker network | -0.445*** | -0.454* | -0.576*** | -0.690** | -0.395 | -0.915** | 0.125 |
| | (0.16) | (0.24) | (0.18) | (0.31) | (0.25) | (0.41) | (0.34) |
| Peer network density | 0.012 | -0.051 | 0.030 | 0.069 | 0.025 | 0.002 | 0.164*** |
| | (0.03) | (0.05) | (0.03) | (0.06) | (0.04) | (0.06) | (0.06) |
| Female | -0.250** | -0.257 | -0.324*** | -0.285 | -0.173 | -0.160 | -0.394* |
| | (0.10) | (0.18) | (0.11) | (0.22) | (0.15) | (0.25) | (0.21) |
| Married | -0.079 | 0.042 | -0.179 | 0.176 | -0.162 | -0.065 | 0.362 |
| | (0.13) | (0.23) | (0.14) | (0.26) | (0.19) | (0.29) | (0.27) |
| Age | 0.004 | 0.005 | 0.003 | 0.009 | 0.011 | 0.003 | -0.006 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) | (0.02) |
| Education (ref. primary school or lower) | | | | | | | |
| Middle school | 0.342** | 0.801*** | 0.265* | 0.731*** | 0.617*** | 0.649** | 0.451 |
| | (0.14) | (0.22) | (0.15) | (0.28) | (0.21) | (0.30) | (0.31) |
| High school or equivalent | 0.291* | 0.986*** | 0.143 | 0.717** | 0.482** | 0.489 | 0.384 |
| | (0.16) | (0.27) | (0.17) | (0.33) | (0.24) | (0.35) | (0.34) |
| Vocational school or higher | 0.420** | 1.064*** | 0.362 | 0.130 | 0.436 | 0.810 | -0.187 |
| | (0.20) | (0.39) | (0.23) | (0.41) | (0.33) | (0.54) | (0.45) |
| Legal knowledge | 0.002 | -0.025 | 0.006 | 0.004 | 0.021 | 0.029 | -0.015 |
| | (0.01) | (0.02) | (0.01) | (0.02) | (0.01) | (0.02) | (0.02) |
| Tenure | -0.006 | -0.019 | -0.009 | -0.017 | 0.007 | 0.0506* | 0.026 |
| | (0.01) | (0.02) | (0.01) | (0.03) | (0.02) | (0.03) | (0.03) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Wage premium (1000 yuan) | -0.171*** | -0.077 | -0.247*** | -0.096 | -0.208** | -0.278** | -0.233* |
| | (0.05) | (0.08) | (0.07) | (0.10) | (0.10) | (0.14) | (0.13) |
| Union | 0.190 | 0.459 | 0.122 | -0.587* | 0.219 | 0.232 | 0.125 |
| | (0.13) | (0.37) | (0.15) | (0.32) | (0.19) | (0.33) | (0.26) |
| Civil society | -0.413* | 0.899* | -0.240 | 1.325*** | -0.687 | 0.692 | -0.355 |
| | (0.25) | (0.55) | (0.28) | (0.46) | (0.43) | (0.68) | (0.48) |
| Local worker | 0.047 | 1.854 | -0.015 | 0.643 | -0.738 | 0.410 | 0.224 |
| | (0.34) | (1.28) | (0.40) | (0.82) | (0.55) | (1.00) | (0.86) |
| Firm ownership (ref. SOEs) | | | | | | | |
| DPEs | 0.131 | 0.595 | 0.174 | 0.941** | 0.322 | 0.878** | 0.556* |
| | (0.16) | (0.40) | (0.19) | (0.40) | (0.28) | (0.42) | (0.29) |
| HMTs | 0.135 | 0.662 | 0.036 | 0.950* | 0.306 | 1.025** | 0.898** |
| | (0.20) | (0.53) | (0.24) | (0.51) | (0.32) | (0.48) | (0.40) |
| FIEs | 0.157 | 0.636 | -0.148 | 2.088*** | 0.239 | 0.332 | 0.349 |
| | (0.22) | (0.81) | (0.28) | (0.65) | (0.35) | (0.68) | (0.47) |
| Firm size (ref. < 100 employees) | | | | | | | |
| 100–299 employees | -0.012 | -0.290 | -0.018 | 0.257 | 0.088 | 0.072 | 0.161 |
| | (0.12) | (0.20) | (0.14) | (0.23) | (0.19) | (0.28) | (0.27) |
| 300–999 employees | 0.214* | 0.449* | 0.226 | 0.126 | 0.242 | 0.378 | 0.231 |
| | (0.12) | (0.24) | (0.14) | (0.27) | (0.20) | (0.29) | (0.26) |
| > 1000 employees | 0.093 | 0.416 | 0.132 | -0.039 | 0.039 | 0.354 | 0.404 |
| | (0.13) | (0.30) | (0.15) | (0.31) | (0.20) | (0.29) | (0.28) |
| Constant | -0.428 | 0.231 | -0.217 | -10.43*** | -2.011 | 0.179 | -0.865 |
| | (0.66) | (1.11) | (0.70) | (1.62) | (1.24) | (1.92) | (2.09) |
| Observations | 3,203 | 1,124 | 2,552 | 678 | 1,345 | 571 | 688 |

*Notes:* Robust standard errors in parentheses. All models control for industry, job types, province of origin dummies, and city dummies. DPE, domestic private enterprise; FIE, foreign-invested enterprises; HME, Hong Kong, Macao, and Taiwan firms; SOE, state-owned enterprise. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

**Table 5. Logit Models Predicting Grievance Filing (Dependent Variable: Grievance Filing)**

| | M14 | M15 | M16 | M17 |
|---|---|---|---|---|
| Province employer-worker network | 0.549 | | | |
| | (0.34) | | | |
| City employer-worker network | | 0.973* | | |
| | | (0.53) | | |
| Village employer-worker network | | | 0.757 | |
| | | | (0.63) | |
| Province supervisor-worker network | | | | 0.0918 |
| | | | | (0.23) |
| Peer network density | 0.0261 | 0.0264 | 0.0302 | 0.0352 |
| | (0.06) | (0.06) | (0.06) | (0.06) |
| Female | -0.559*** | -0.581*** | -0.542** | -0.561*** |
| | (0.21) | (0.21) | (0.21) | (0.22) |
| Married | 0.331 | 0.325 | 0.314 | 0.307 |
| | (0.24) | (0.24) | (0.24) | (0.24) |
| Age | -0.0152 | -0.0157 | -0.014 | -0.0142 |
| | (0.01) | (0.01) | (0.01) | (0.01) |
| Education (ref. primary school or lower) | | | | |
| Middle school | -0.432 | -0.434 | -0.419 | -0.457 |
| | (0.28) | (0.28) | (0.28) | (0.28) |
| High school or equivalent | -0.588* | -0.587* | -0.572* | -0.606* |
| | (0.33) | (0.33) | (0.34) | (0.33) |
| Vocational school or higher | 0.229 | 0.205 | 0.23 | 0.193 |
| | (0.45) | (0.45) | (0.46) | (0.45) |
| Legal knowledge | 0.0415** | 0.0417** | 0.0408** | 0.0403** |
| | (0.02) | (0.02) | (0.02) | (0.02) |
| Local worker | 0.315 | 0.281 | 0.278 | 0.316 |
| | (0.75) | (0.75) | (0.75) | (0.74) |
| Tenure | 0.0239 | 0.0215 | 0.0219 | 0.0248 |

| | | | | |
|---|---|---|---|---|
| | (0.03) | (0.03) | (0.03) | (0.03) |
| Wage premium (1000 yuan) | 0.0939 | 0.0874 | 0.0916 | 0.103 |
| | (0.15) | (0.15) | (0.15) | (0.15) |
| Union | 0.207 | 0.217 | 0.21 | 0.217 |
| | (0.27) | (0.26) | (0.26) | (0.26) |
| Civil society | 1.207* | 1.235* | 1.204* | 1.191* |
| | (0.66) | (0.66) | (0.66) | (0.66) |
| Firm ownership (ref. SOEs) | | | | |
| DPEs | -0.0781 | -0.0765 | -0.0687 | -0.0688 |
| | (0.33) | (0.34) | (0.34) | (0.34) |
| HMTs | -0.438 | -0.439 | -0.45 | -0.448 |
| | (0.42) | (0.42) | (0.42) | (0.42) |
| FIEs | 0.0142 | 0.0394 | 0.0336 | 0.0193 |
| | (0.46) | (0.46) | (0.46) | (0.46) |
| Firm size (ref. < 100 employees) | | | | |
| 100–299 employees | 0.161 | 0.182 | 0.168 | 0.137 |
| | (0.25) | (0.25) | (0.25) | (0.25) |
| 300–999 employees | -0.387 | -0.396 | -0.385 | -0.405 |
| | (0.25) | (0.25) | (0.25) | (0.25) |
| > 1000 employees | -0.239 | -0.235 | -0.234 | -0.265 |
| | (0.26) | (0.26) | (0.26) | (0.26) |
| Constant | 1.55 | 1.545 | 1.497 | 1.525 |
| | (1.66) | (1.65) | (1.66) | (1.67) |
| Observations | 782 | 782 | 782 | 782 |

*Notes:* Robust standard errors in parentheses. All models control for industry, job types, province of origin dummies, and city dummies. DPE, domestic private enterprise; FIE, foreign-invested enterprises; HME, Hong Kong, Macao, and Taiwan firms; SOE, state-owned enterprise. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

## Appendix

**Table A.1. Labor Law Violations**

| Labor law violations | Description |
|---|---|
| No social insurance | Respondents to the survey were asked whether their current employers provided pension insurance, medical insurance, work injury insurance, unemployment insurances, and maternity insurance. *No social insurance* is a dummy that equals 1 if the respondent does not have all five types of social insurance required by the law. |
| No labor contract | One question in the survey asks, "Have you ever signed a written labor contract in your current firm?" *No labor contract* equals 1 if the worker answered no to this question, 0 otherwise. |
| Overtime | Chinese labor law prohibits employers from requiring their employees to work overtime for more than 36 hours per month. One question in the survey asks the respondents, "Have you ever worked overtime since January 1, 2010?" Workers who answered yes to this question were required to report their overtime hours in the previous month. I code *Overtime* as a dummy variable that equals 1 if their overtime work exceeded 36 hours the month before the interview, 0 otherwise. |
| Wage violations | *Wage violation* equals 1 if the employee has experienced any of the following violations:<br><br>1) The Labor Law provides that employees must be compensated if they work overtime. One question in the survey asks, “Does your current firm have overtime compensation?” *Overtime without compensation* is a dummy variable that equals 1 if the respondent answered no to this question, and *overtime* equals one.<br><br>2) The Labor Law requires that wages shall not be misappropriated nor shall the employer fall in arrears without justification. The survey asks, “Since January 1, 2010, have you ever been imposed a fine or wage deduction at your current firm?” For those who answered yes, they were asked, “Does the firm impose the fine or deduction following institutional rules?” I code *wage misappropriation* as 1 if the worker answered no to this question, 0 otherwise.<br><br>3) The survey asks, “Since January 1, 2010, have you ever experienced wage arrears in your current firm?” *Wage arrears* |

| | |
|---|---|
| | is coded as 1 if the respondent answered yes to the question, 0 otherwise.<br><br>4) Under China's minimum wage system, minimum wage levels are fixed by local governments and are regularly adjusted. The survey asks about respondents' average monthly wage since January 2010. I code *Below Minimum* as 1 if the worker's monthly wage is below the city minimum wage in 2010, 0 otherwise. |
| Occupational Safety and Health (OSH) | The Labor Law requires employers to provide necessary protective equipment, such as goggles, work clothes, head covering, and other items needed for the protection of workers. For workers in dangerous occupations or exposed to hazardous substances, the employer is required to provide regular medical examination at the expense of the company. In the survey, workers were asked a series of questions related to their experience of health and safety violations. *OSH* equals 1 if workers experienced any of these two violations, 0 otherwise.<br><br>1) Unprotected work. The survey asks, "Since August 1, 2009, have you worked under dangerous conditions without protection in your current firm?" *Unprotected work* equals 1 if the respondent answered yes, 0 otherwise.<br><br>2) Hazardous work without exam. The survey asks, "Since August 1, 2009, have you worked in a hazardous environment (such as exposed to hazardous substance and noise) in the current firm?" It also asks, "Have you ever received a free physical exam in your current firm?" *Hazardous work without exam* is a dummy variable, which equals 1 if the worker reported that the working environment in the current firm is physically harmful (i.e., exposes workers to hazardous substance, noise, etc.) and the current firm did not provide physical examinations. |
| Forced labor | Both Chinese Labor Law and Criminal Law explicitly prohibit forced labor. *Forced labor* refers to situations in which workers are coerced to work using intimidation or violence, or are manipulated by debt or retention of identity papers. *Forced Labor* equals 1 if workers experienced any of these two violations.<br><br>1) Physical abuse. The survey asks, "Since August 1, 2009, have you experienced forced labor, penalty kneeling and standing, improper search, battery, or seizure by the |

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| | management?" If the worker experienced any of these experiences, *physical abuse* is coded as 1, 0 otherwise.<br><br>2) A prevalent form of Labor Law violation is employee paying "deposits" to the employer in forms of money or documents. These "deposits" prevent workers from leaving jobs where their rights are violated. In the survey, the respondents were asked two questions: (a) "When you joined the current firm, did you pay a money deposit?" and (b) "When you joined the current firm, were your government-issued ID, graduation certificate, or (temporal) residence permit detained by the management?" *Deposit* is a dummy variable that equals 1 if the worker answered yes to any of these two questions, 0 otherwise. |
| Any violation | *Any violation* is a dummy variable that equals 1 if the workers experienced any of the six types of violations, 0 otherwise. |

**Table A.2. Key Control Variables Description**

| Variable | Description |
|---|---|
| Female | *Female* (= 1 if the respondent is female, 0 otherwise) workers are more likely to work in gender-segregated, low-paying jobs but less likely to work in physically demanding positions or at dangerous sites. Previous research suggests that female workers are less likely to name and claim violations because of their lack of informal networks of information, avoidance of conflict (Gwartney-Gibbs and Lach 1994), and the internalized discipline of subordinates (Lee 1998). |
| Age | *Age* is a continuous variable relating to the respondents' age in 2010. The existing literature stresses the awakening and rights consciousness of the new generation of migrant workers (Chan and Pun 2009; Pun and Lu 2010), which suggests that younger migrant workers may be less likely to work for employers who violate the labor laws and more likely to name and claim the violations. Because the existing literature usually defines the new generation of migrant workers as those who were born from 1980 and onward, I also create a dummy variable Post80 as an alternative measure. |
| Education and legal knowledge | Respondents' educational level and legal knowledge have been found to be associated with their job quality as well as their inclination to file grievances (Gallagher, Giles, Park, and Wang 2015). *Education* equals 0 if the respondents' highest degree is primary school, 1 if middle school, 2 if high school or technical secondary school, and 3 if vocational school or higher. *Legal knowledge* is coded based on seven survey questions about respondents' familiarity with seven labor laws and regulations. The seven laws and regulations are Labor Law, Labor Contract Law, Employment Promotion Law, Minimum Wage Regulation, Regulation on Payment and Wages, Regulation on Work Injury Insurance, and Law on the Protection of Rights and Interest of Women. The respondents were given a score based on their familiarity with each law or regulation (5 = very familiar, 4 = familiar, 3 = somewhat familiar, 2 = not familiar, 1 = have not heard about it). *Legal Knowledge* is a continuous variable ranging from 7 to 35, as the sum of the scores on the seven questions. |
| Wage premium | *Wage premium* is measured as the difference between the respondents' average monthly wage since January 1, 2010, and the city's monthly minimum wage in 2010. The city minimum wage data were collected from the Human Resources and Social Security Bureau websites of each city. The wage premium is a proxy for the value of current employment over alternative jobs in the external market. The wage premium measure may include measurement errors because local regulations on whether workers' own social insurance contributions |

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| | should be included in the wage package vary by region. It is unknown whether workers included their social security contributions when they reported their monthly wage. |
| Union | *Union* is a dummy variable that equals 1 if workers reported an enterprise labor union is in their firm or a regional union in their community. Although Chinese labor unions have always been criticized for being "paper unions," recent research suggests that unions have heterogeneous organizing strategies (Liu 2010; Friedman 2014), bureaucratic power to settle conflicts (Chen 2003), and positive effects on employees' wage and welfare (Yao and Zhong 2013). I expect that the presence of unions will be negatively correlated with experiencing labor law violations, and that workers will be more likely to name and claim violations if there are labor unions in their firms or communities. |
| Civil society | *Civil society* is a dummy variable that equals 1 if workers reported the presence of a women workers' association, NGO, or religious group in their community. Workers may learn about their legal rights through these organizations, which may also help them navigate grievance resolution channels (Klandermans, van der Toorn, and van Stekelenburg 2008; Fu 2017). I expected that workers' embeddedness in these civil society organizations would reduce the likelihood of experiencing labor law violations and increase the likelihood of naming and claiming violations. |
| Firm size | *Firm size* is a categorical variable that equals 0 if the firm has fewer than 100 employees, 1 if the firm has 100 to 299 employees, 2 if the firm has 300 to 999 employees, and 3 if the number of employees equals or exceeds 1,000. |
| Industry | *Industry* includes agriculture and mining, manufacturing, construction, utilities, and service industry. |
| Firm ownership | *Firm ownership* includes state and collectively owned enterprises (SOEs); domestic private enterprises (DPEs); Hong Kong, Macao, and Taiwan firms (HMTs); and other foreign-invested enterprises (FIEs). |
| Job types | *Job type* includes production workers, technicians, logistics workers, line supervisors or foremen, quality inspectors, clerk, waiter, security guard, cleaner, driver, salesperson, construction workers, and others. |
| Local worker dummy | Local worker dummy equals 1 if respondents work in their home province, 0 otherwise. |
| Tenure | It measures workers' tenure (year) at the current firm. |

## Essay 2: Do Flexible Working Time Arrangements Reduce Worker Turnover? Evidence from German Linked Employer-Employee Data[8]

### Introduction

Contemporary organizations are increasingly implementing flexible working time arrangements that provide workers with more control over individual working hours (Moen, Kelly, and Hill 2011; Davis and Kalleberg 2006). It has been argued that these arrangements can potentially retain workers in the organization (Batt and Valcour 2003; Yanadori and Kato 2009; Stavrou and Kilaniotis 2010), which may consequently facilitate labor cost reduction, organizational learning (Argote and Epple 1990; Heavey, Holwerda, and Hausknecht 2013) and improve organizational productivity (Dess and Shaw 2001; Batt 2002; Ton and Huckman 2008).

Do flexible working time arrangements reduce worker turnover? Although there have been numerous studies investigating this question (see Shockley, Smith, and Knudsen 2017 for a review of this literature), existing studies have been dominated by cross-sectional studies that cannot account for unobserved heterogeneity across establishments that may bias estimates (Osterman 2018; Kelly et al. 2008). The most compelling evidence in this literature is from case studies and involved relatively short follow-up periods (Dalton and Mesch 1990; Moen, Kelly, and Hill 2011; Moen et al. 2017). It is not clear whether these findings in a few organizations can be generalized to a broader range of workplaces and workforces, and whether organizational- level flexible working time practices remain relevant for workers in countries with supportive national

[8] All results have been reviewed by the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB) to ensure that no confidential information is disclosed. All errors are my own.

work-family policies.

In this paper, I empirically investigate the effectiveness of flexible working time arrangements as an employee retention strategy. To that end, I use nationally representative administrative linked employer-employee data from Germany, a country with innovative flexible working time arrangements and strong work-family regulatory policies. To my knowledge, this paper is the first study that uses a nationally-representative longitudinal panel to study the relationship between flexible working time arrangements and turnover. I focus on two distinctive types of employee-oriented flexible working time arrangements in German organizations: a flextime model with working time accounts, a practice that gives workers some control over their work schedule within certain limits, and trust-based (self-managed) working time arrangements, a practice that gives workers (almost) full control over when and how long they work. I estimate workers' probability of leaving establishments after the adoptions of these practices. Using linear probability models with establishment and year fixed effects, I find that adopting these flexible working time arrangements does not reduce overall employee turnover, but it reduces the probability of turnover for women with young children and for both young men and women.

These results suggest that providing flexible working time policies is not a panacea for retaining all workers, but such policies help retain workers that are most in need of them. The policies can play an important role in helping young workers develop their human capital.

Further, by addressing mothers' needs at a critical period in their lives, flexible working time policies may reduce the gender pay gap by encouraging women to both

remain in the labor force and continue building their careers in a given organization, even in settings with strong regulatory work-family policy support.

## Theory and Literature

Does the availability of flexible working time arrangements work to retain employees? A whole body of psychology research supports the notion that humans are anxious to achieve control in their lives and, by extension, in how they spend their time. The autonomy people enjoy over their working time can elicit favorable work attitudes and behaviors (Deci and Ryan 1987; Skinner 1996; Deci, Olafen, and Ryan 2017). Work-family initiatives at the workplace, including flexible working time arrangements may make workers feel greater control and autonomy and could lead to higher employee satisfaction and thriving, in turn reducing their probability of leaving the organization.

However, the effects of flexible working time arrangements on worker turnover are not unambiguous. In the German context, the history of flexible working time arrangements suggests that those arrangements were first introduced as a response to concerns about traffic congestion and then to fluctuations in demand rather than as a strategy to help workers achieve work-life balance. Flexible working time arrangements were introduced in German workplaces in the late 1960s for reducing rush-hour commuting time. In the 1980s, the sectoral collective bargaining agreement in the metal industry allowed for variations in working time in response to product demand, i.e. for management-driven flexibility. Subsequent agreements in the metalworking industry in 1987 and 1990 provided a model for German firms to achieve flexibility in labor hours and gain efficiency, which led to a variety of working time flexibility models throughout the economy (Berg 2008; Herzog-Stein and Zapf 2014).

## Flexible Working Time Arrangements in German Organizations

### *Flextime Model through Working Time Accounts (WTA)*

Manifold working time arrangements exist in German organizations today under the umbrella of working time flexibility. Flextime (gleitzeit) was an early arrangement in which working times fluctuate daily around defined core times during which all workers must be present, but otherwise workers are permitted to choose the time to start and end work (Hunt 2013). Flextime is often organized with working-time accounts (Arbeitszeitkonto). With working time accounts (WTA), workers can bank hours they have worked beyond their contractually agreed working hours. Some practices also allow workers to accrue time deficits if they work less than the contractually agreed hours, but the time account/bank must be balanced after a predetermined period.[9]For the time that flows into the account, no wage or overtime surcharge will be paid. For example, if contractual hours are 40 per week and an employee works 44 hours in a given week, 4 hours are "deposited" into the WTA. In a few weeks, the employee may decide to work 36 hours and claim the banked 4 hours. No overtime premium wage earned in the week with 44 hours of work.

Some scholars call the flextime model with working time accounts (WTA) "regulated flexibility" because its use is an integral part of the German industrial relation system (Seifert 2008). It is not regulated by government legislation, but by industry or

[9] Depending on the length of the balancing period, working time accounts can be categorized into two types: short- term working time accounts with a balancing period of no more than two years and long-term (lifetime) working time accounts with longer balancing periods. The long-term accounts are regulated by the Flexi-II law and allow workers to accumulate larger amounts of time in order to take prolonged periods of leave for education, leisure, childcare, and most importantly, early retirement (Wotschack and Hildebrandt 2007; Wotschack 2017; Herzog-Stein and Zapf 2014). Because long-term working time accounts are rarely adopted and used by workers (Wotschack 2010 2017), this study focuses on short-term working time accounts.

workplace collective agreements, which set the conditions for the use of WTA.[10] The collective bargaining arrangements determine from what sources, under what conditions and to what extent time credits can be accumulated and spent (Bispinck 2006; Doellgast and Berg 2018). The regulations usually cover workers with and without union membership (as would be expected under Germany's bargaining traditions). The actual organization of working time rules is usually negotiated between management and works councils, which are elected groups of workers to address everyday workplace concerns. Works councils afford employees a secure basis on which to claim and use the agreed-upon schedules and options. Both parties have to make compromises to meet the interests of both employers and workers.

Whether a flextime model with WTA reduces worker turnover may depend on whether employees benefit from using it. Although *employers* can benefit significantly from a WTA program because of the reduction of overtime pay and layoff and hiring costs (Bellman and Hübler 2015; Berg 2008), its use can both induce benefits and risks to employees. The adoption of a flextime model may reduce worker turnover through two mechanisms. First, employees may benefit from this model by gaining leeway to adapt working time to their time demands outside of the workplace such as care work, sabbatical-type leaves, and personal development. For example, a parent with high family demands (such as doctor's visits, a school play, etc.) can take time off from work in a busy week by reclaiming time banked in the working time account from earlier weeks. In addition, the use of the flextime model with working time accounts can avoid layoffs in

[10] Employees' working time is legally regulated by the Working Hours Act (Arbeitszeitgesetz, ArbZG). The Working Hours Act does not regulate the introduction and use of working time accounts, whose use is regulated by industry- level or company-level collective bargaining arrangements.

economic downturns. For example, in 2007, a ruling of the Federal Labor Court strengthened the layoff disincentive by holding that an employer could not lay off a worker if any coworker doing the same job has surplus time in his or her account (Möller 2010; Herzog- Stein, Lindner, and Sturn 2017). Thus, the model is sometimes described as an important reason for Germany's "labor market miracle" in the Great Recession (Burda and Hunt 2011).

However, workers may not benefit from the adoption of a flextime model if such practices are primarily driven by the needs of business. If hours are banked in working time accounts when demand is high and workers must put in extra hours and then the hours are reclaimed when demand is low and workers are sent home, the workers may not be satisfied at all. To take another example, workers may accumulate a large number of hours in their working time accounts, but the hours remain in the working time accounts cannot be reduced during the compensation period. Workers may actually work longer hours without getting an overtime premium (Zapf 2015), especially when unions and works councils are not present.

***Trust Based (Self-Managed) Working Time (TBWT)***

More recently, Germany has seen the emergence of trust-based working time arrangement (TBWT) or self-managed working time (in German *Vertrauensarbeitszeit*). Building on a general trend of decreasing core working hours flextime (i.e., requiring fewer hours in which all employees must be present), TBWT allows workers to determine their schedules. Employees are responsible for organizing their working time according to their tasks and workload. Workers can allocate time independently and freely to achieve a specific work result (Singe and Croucher 2003; Godart, Gorg, and

Hanley 2017; Beckmann 2016; Beckmann Cornelissen and Kräkel 2017). When TBWT is introduced, the task of recording hours falls on the employees (rather than being tracked by management), though the employers are still held responsible for ensuring that valid records of overtime hours are recorded and kept for at least two years (Section 3, Paragraph 1, The German Working Time Act-the Arbeitszeitgesetz ArbZG). Even though unions do not enthusiastically facilitate the adoption of this arrangement because they can no longer regulate and track the duration of workers' working hours, TBWT is widely diffused across sectors for both white-collar and blue-collar employees, and there is above average use in high-paying service industries. It was adopted early by organizations that are seen as pioneers in working time innovation, such as IBM, Siemens, and major German banks (Singe and Croucher 2003).

Firms may benefit from such a practice because it allows workers the flexibility to work their most productive hours (Konrad and Mangel 2000; Beckmann, Cornelissen, and Kräkel 2017; Beckmann 2016), but its effects on worker turnover are also ambiguous. TBWT may reduce worker turnover because it grants workers the highest level of autonomy to help them balance their work and family lives or address personal priorities, more broadly. However, since overtime work is no longer defined, this practice may also lead to more working hours than is specified by the employment contract (Kelliher and Anderson 2010; Lott and Chung 2016; Chung and van der Horst 2018) and compel workers to conform to the ideal worker norm (Williams, Blair-Loy, and Berdahl 2013).

This study distinguishes between the effects of these two forms of FWTA, the flextime model with working time accounts (WTA) and trust-based working time

(TBWT). Table 1 summarizes the effect mechanisms of working time flexibility on worker turnover and the potential risks associated with these arrangements. I hypothesize that

*H1a. Overall, workers are less likely to leave the organization after the adoption of flextime model with working time accounts*

*H1b. Overall, workers are less likely to leave the organization after the adoption of trust-based working time model*

<Insert Table 1 about here>

## A Gendered Life-Course Perspective in the Context of Welfare State Supports

### *The Role of FWTA on Mothers' Retention after Childbirth*

Flexible working time arrangements (FWTA) may affect employees differently, depending on their gender, age, and parental status (Batt and Valcour 2003; Moen, Kelly, and Hill 2011). The job-demand-resource theory suggests that workers' work-family conflict and fit are associated with the demands placed on workers and resources available to them at the workplaces, as well as the demands and resources they face at home (Bakker and Geurts 2004; Schiman Galvin, and Milkie 2009; Voydanoff 2004). Workers' housework and care demands change over the life course, and the transition to parenthood intensifies gender separate spheres and a more traditional division of housework. Working couples', especially women's time in domestic work appear to peak when children are young (Baxter, Hewitt, and Haynes 2008; Kühhirt 2012). Thus, it is expected that flexible working time arrangements should be especially effective to retain mothers with young children at home.

Germany is a particular interesting case for examining flexible working time arrangements on mothers with young children because it has long been the archetype of a traditional conservative welfare regime but is transforming towards a more gender-egalitarian, dual-earner model. For many years, the family policies supported male breadwinner and female homemaker culture by providing long parental leaves for mothers, low level of public childcare, and high taxation on working wives (Esping-Andersen 1990; Ostner 1993). German women's time spend in domestic work and employment rate had a clear life-course pattern, which is largely a response to motherhood (Gangel and Ziefle 2009; Gustafsson, Wetzels, Vlasblom, and Dex 1996). Childbirth leads to a highly gendered division of labor by increasing women's domestic work (Kühhirt 2012; Leopold, Skopek and Schulz 2018) at the cost of their time in the labor market. For the two cohorts of women born in the 1960s, within a five-year window after childbirth, only half of the mothers return to the labor force (Gangel and Ziefle 2009).

To promote mothers' continuous employment, Germany has since the 2000s initiated a major shift towards a "sustainable" welfare state model with more gender-egalitarian, dual- earner social policy (Esping-Andersen 2009; Lewis 2009; Ostner 2010; Ray, Gornick, and Schmitt 2010; Collins 2019). The 2001 German Part-Time and Fixed-Term Employment Act (Teilzeit- und Befristungsgesetz, or TzBfG) gives workers (in companies with more than 15 employees) who cannot commit to working a full-time schedule the opportunity to work part- time. The 2007 maternity leave policy reform replaced a previous means-tested, flat-rate child-raising benefit (Erziehungsgeld) with "parental money" (Eltergelt), which replaces 67% of previous net labor earnings for up to

12 months after the birth of a child. If both father and mother participate, they can receive additional months of wage compensation ("daddy months"). The resulting total of 14 months can be freely distributed between the two parents, which may alleviate women's workload at home at a critical time (Kluve and Tamm 2013). Furthermore, in the mid-2000s, the government started to implement a series of childcare expansions aimed at speeding up mothers' returns to employment (Mätzke 2019; See Appendix Table A1 for a detailed summary of the work-family policy reforms.)

These policies have significantly reduced the demands of mothers' at critical period of time and facilitated women' employment after childbirth. The prime age women's employment rate has increased from 60 percent in 2005 to 72 percent in 2018. This evidence suggests that the national policy changes might be more decisive for mothers' work behavior than firm-level flexible working time arrangements. For mothers with young children, these policy changes may have reduced the demands of mothers at a critical period in their lives and make firm-level flexible working time options less relevant. To test the effectiveness of organizational flexible working time policies on mothers' turnover under extensive state regulation of work-life reconciliations, I hypothesize that

> *H2. Mother with young children are less likely to leave the organization after the adoption of flexible working time arrangements.*

***The Value of FWTA across Workers' Life-Course***

Although flexible working time arrangements can play important role in retain mothers with young children, framing workers' need for flexibility, as mothers' issue only, may no longer suffice in theorizing about the role of flexible working time policies due to the

changing work value and gender roles among young workers. The generation theory in organizational behavior literature suggests that younger workers hold different work values and have different needs compared to older workers (Twenge, Campbell, Hiffman, and Lance 2010; Parry and Urwin 2011). The youngest generation of workers (Generation Y or Millennials) are frequently expressed the highest interest regarding flexible work arrangements (Ng, Schweitzer, and Lyons 2010). Younger workers, regardless of gender, have greater interest in flexibility at work to maintain a balance between work and other aspects in life, such as leisure and training opportunities (Lyons & Kuron 2014; Bal and Lange 2015).

In the German context, the work-family reforms have not only shaped the opportunity structure of maternal employment, but also have influenced the cultural ideals regarding division of labor in the household. Research has shown that men's and women's relationship preferences converge toward egalitarianism when that option is made available to them (Gerson 2009; Pedulla and Thébaud 2015). Cohort replacement theory suggests that people's early-life experience in adolescence and young adulthood leave a lasting print on their view and attitude, which remain fairly stable over adulthood (Krosnick and Alwin 1989). The younger generation of workers are exposed to more gender-egalitarian institutions during their early life than individuals from older cohort, which should result in them holding more egalitarian gender attitude (Brewster and Padavic 2000; Bolzendahl and Myers 2004; Brooks and Bolzendahl 2004)

Several recent studies using panel data from the German Socio-Economic Panel Study suggested that Germany is making progress towards equitable gender arrangements in the division of labor in the household. Leopold et al. (2018) find that the gender gap in

housework time converged across cohorts. Women of younger cohorts perform significantly fewer hours of housework than women of older cohort, and younger cohort men spend longer time in housework work than older cohort men. The young generation of German men also tend to prefer and achieve a slight reduction in working hours when they become fathers (Pollmann- Schult and Reynolds 2017). These evidence suggests that the welfare state work and family policy reforms may have shifted the gender ideology of young men and women, who are expected to have egalitarian relationships where both partners are expected to contribute equally to earning and caregiving (Brooks and Bolzendahl 2004; Cooke 2007; Knight and Brinton 2017). Because of the changed work value and gender ideology among the younger generation of workers, I hypothesize that,

*H3. Both young men and women are less likely to leave the organization after the adoption of flexible working time arrangements.*

## Data, Measures, and Model

### Data

To assess flexible working time arrangements' effects' on worker turnover, I analyze linked employer and employee data (LIAB-cross-sectional model) from the Institute for Employment Research (IAB), that combines the IAB Establishment Panel and individual social security records (Alda, Bender, and Gartner 2005). The IAB Establishment Panel is an annual stratified random sample of approximately 15,000-16,000 establishments each year. [11] The sample of the Establishment Panel is drawn from establishments

[11] Rather than a random sample, the establishment survey is disproportionately stratified in three dimensions. First, the sample is stratified by 16 *federal states* aiming for a sufficient representation of all states in the data. Second, the survey sample is stratified by ten *establishment size* classes. This is because the population is very much skewed toward small establishments, whereas the survey also aims to

included in the employment statistics register. The population for the survey is all establishments with at least one employee covered by the social security system as of 30 June of the previous year. I further use the administrative data to construct a consistent industry classification as introduced by Eberle et al. (2011) and use information on establishment location contained in these data.

Based on the Establishment Panel, the population of individual employees and trainees are drawn from the Employment Statistics Register.[12] The sample used in this study includes workers who work full-time or part-time and are eligible for social security, marginal part-time workers[13], and employees in partial retirement. Workers under 20 years old, trainees, and student interns are excluded from the analytic sample. Establishments with 20 or fewer workers included in the above restriction are not subject to the analysis because the working time arrangements are usually informally negotiated in small organizations, and employees in small organizations are not covered by government regulations and mandates such as the Employment Protection Act (Kündigungsschutzgesetz)[14]and the Part-Time and Fixed-Term Employment Act.

Establishments do not appear in every survey due to both establishment closure and survey non-response.[15]Thus, the data set is an unbalanced panel of individuals within

understand large establishments, since they employ a large number of employees. Third, the survey sample stratifies by 19 industries (2010 and after; 17 industries from 2004-2009) to allow for differentiated analyses in this respect. Therefore, small federal states, large establishments, and small sectors as well as manufacturing industries in East Germany are overrepresented in the sample. With a disproportionate sample structure, analyses of unweighted data could lead to non-representative results. These disproportionalities are corrected by the weighting procedure.

[12] Freelancers, civil servants, and self-employed person are not included in LIAB.

[13] Marginal part-time ("mini job") workers are people whose earnings are not more than 400 Euro per month and who are exempt from paying social security contributions.

[14] The Employment Protection Act establishes certain rules for dismissals. It only applies to companies with more than ten employees with continuous employment relationships of more than six months at the same company.

[15] See Heining, Scholz and Seth (2013) for a discussion of sample selection and non-response.

establishments. Since questions about establishments' working time arrangements were included in the 2002, 2004, 2006, 2008, 2010, and 2012 Establishment Panels, each individual may appear in the data set up to six times (once in each of these year).[16] My analytical sample contains around 6,500 establishments per year and 10,937,457 person-year observations; 61% of the observations are for men and 39% are for women.

**FWTA Measures**

Two measures of flexible work arrangement in the Establishment Panel capture the two types of flexible work time practices. *Flextime with Working Time Account* is constructed based on one question in the survey that asks: does your establishment/office offer working time accounts such as flextime? The variable equals one if the respondent indicates that working time accounts are already in operation, and is zero if those practices were not present (or were reported as planned but not operating yet). *Trust-based (self-managed) working time (TBWT)* arrangement is based on one question in the survey that asks whether the establishment makes use of trust-based work hours/self-managed work schedules (without time recording by the establishment). TBWT equals

[16] The incidence of self-managed working time has been covered in even years starting from the 2004 Establishment Panel. The incidence of flextime with working time accounts has been covered in the 2002, 2004, 2006, and 2008- 2015 Establishment Panels. However, a larger share of establishments claim to use it in odd years. This fluctuating adoption rate may be caused by the fact that in even years, the questionnaire contains detailed questions about overtime and overtime compensation before the question on flextime with working time accounts, whereas in odd years overtime compensation is not addressed. It can be assumed that the problem arises with establishments that manage some kind of flexibility by using overtime but do not consider themselves as using working time accounts per se. In even years, these establishments can choose the appropriate forms of overtime compensation and refrain from ticking working time accounts. In odd years, this procedure is not possible (Bellman and Hübler 2015). For this reason, I only analyze working time accounts for even years since 2002.

one if the employer representative answered yes to this question, and zero otherwise. I construct an *Any-flex* dummy to indicate the existence of either policy in the current year.

## Models

*Modelling Selective Adoption of Flexible Working Time Arrangements (FWTA)*

Before analyzing flexible working time arrangements' effects on worker turnover, I first model the adoption of these practices. Such analyses can shed light on the potential selection biases in previous cross-sectional studies and partially reveal organizations' motivations for adopting those practices. They are also relevant to the analysis of post-adoption effects on worker turnover because the analyses help to explain whether these policies affect exactly the subgroups (e.g., women) they are designed to help, and whether the policies help those that are most in need of them.

To evaluate the characteristics of organizations who adopt FWTA, I study pre-FWTA-adoption data in this study because workers who need flexibility are likely to enter the establishments after adoption, and establishments may also transform after adoption. All years from the first year of FWTA adoption onward are excluded from the analysis, even if the establishment later allowed FWTA to lapse.

I use OLS regression models to assess the effects of independent variables on establishments' likelihood of adopting flexible working time arrangements. There are several reasons why linear (ordinary least squares) regression models rather than non-linear, such as logit or probit, models are used in equations (1) and (2) when dependent variables are binary. First, linear regression allow for direct interpretation of the coefficient as probabilities, while converting logit and probit coefficients into

probabilities requires the additional complexity of methods such as marginal standardization and prediction at the means. Second, even if the conditional expectation function (CEF) is nonlinear, regression approximates the CEF very well. OLS estimates and marginal effects from nonlinear models are usually close (Angrist and Pischke 2009 p.38; p.104-107). Third, all analyses are conducted on-site at an IAB data enclave using its computing resource. Computing constraints in the enclave restricted my ability to use conditional logit models. This is also a problem facing other researchers who use the linked employer-employee administrative data to study turnover (e.g., Campbell, Ganco, Franco, and Agarwal 2012; Kacperczyk and Balachandran 2018).

Because establishments in certain industries and geographic regions are more likely to adopt FWTA than others, and adoptions of FWTA occur at different points in time, I fit models with fixed effects. My comparison estimates the probability of adopting the policies for establishment within (federal state × industry × year) groupings. I do not use establishment fixed effects because the purpose of this analysis is to show time-variant and time-invariant factors that are associated with adoption. Using establishment fixed effects could absorb time-invariant predictors, such as works councils, which are important predictors of adoption in this analysis. The model is thus written as:

(1) $Adoption_{jf} = X_{jt} + \theta_{rkt} + \varepsilon_{jt}$

| | |
|---|---|
| $Adoption_{jf}$ | establishment *j* will adopt a certain type of flexible working time practices f in future (0, 1) |
| $X_{jt}$ | characteristics of establishment *j* in year *t* |
| $\theta_{rkt}$ | region *r* × industry *k* × year *t* fixed effect |
| $\varepsilon_{j}$ | error term clustered by establishment |

The dependent variable *Adoption* indicates whether the establishment will adopt type f (f=flextime model with working time accounts or trust-based working time arrangements) flexible working time arrangements in the future. The key independent variables include factors that may affect the adoption. The definitions of these variables are summarized in Table 2 Panel A.

*Modeling the Effects of FWTA on Employee Exit*

To evaluate FWTAs' effects on employee exit, I fit the following linear probability regression models for men and women separately. Running the analysis in a split sample allows the coefficients for all predictors to vary between men and women. This is motivated by studies by Blau and Kahn (1981), Light and Ureta (1992), and Royalty (1998) whose work shows that factors may affect turnover probability differently for men and women. For example, previous research has found that working part-time significantly increases the odds of quitting for men but not for women (Booth, Francesconi, and Garcia-Serrano 1999). Children also have opposite effects for men and women. Men tend to be less likely to leave their jobs after childbirth, while women becomes more likely to leave their jobs after becoming mothers (Frederiksen 2008). Furthermore, women's job separation rate is significantly less wage-elastic than men (Hirsch and Schnabel 2012). This evidence suggests an interplay of gender differences in turnover behavior and justifies the use of separate models for male and female turnover. The model is thus written as:

$$(2)\ Exit_{ijt} = X_{1\ ijt} + X_{2jt} + FWTA_{jt} + \theta_j + \gamma_t + \varepsilon_{it}$$

$Exit_{iit}$ Worker *i* exits establishment *j* during year t to t+1

$X_{1ijt}$ Worker *i*'s characteristics in year t

$X_{2jt}$ Establishment *j*'s characteristics in year t

$FWTA_{jt}$ Establishment *j* having a certain type of flexible working time arrangements in

year t (1=yes; 0=no)

$\theta_j$ Establishment fixed effects

$\gamma_t$ Year fixed effects

$\varepsilon_{ijt}$ Error term clustered by establishments

The dependent variable is *exit,* measuring whether an individual had left the establishment between year t and t+1. To be conservative regarding the FWTA in place at the time of exit, this variable is censored if the establishment is not surveyed in t+1 or if the worker exits the establishment between surveys. For example, *exit* would be coded as 0 in 2004 for an employee whose last year of work was 2005 (the worker left the establishment between 2005 and 2006) and missing thereafter. The reason is that if the respondent stated flexible working time arrangement was (or was not) provided in the 2004 survey but was not (was) in 2006 survey, I cannot determine whether the worker's exit preceded or followed the change related to the flexible working time arrangement. I compared the worker characteristics of those who exited in even years and those who exited in odd years, and the characteristics of workers do not differ significantly between even and odd years (results are available upon request). The key independent variable *FWTA* measures whether the establishment has a certain type of flexible working time arrangements in year t.

I control for a vector of worker and establishment characteristics that may affect turnover (Griffeth, Hom, and Gaertner 2000). The definitions of these variables are summarized in Table 2 Panel B. I control for workers' age and its quadratic term, tenure and its quadratic term because age and tenure are expected to be negatively correlated with worker turnover (Abraham and Farber 1987; Farber 1999), and their quadratic forms are expected to be positively associated with worker turnover. I control for workers' daily wage because the wage premium is expected to be negatively associated with worker turnover (Campbell, Ganco, Franco, and Agarwal 2012). Since wages are top-coded at the ceiling for workers' social security contributions, I create a dummy variable coded one if the wage is right-censored, zero otherwise. To investigate how FWTAs affect workers of different wage levels, I create three dummy variables indicating whether the employees are top-, medium-, or low-wage earners according to the distribution of absolute wages within their establishment in any given year (Carnahan, Agarwal, and Campbell 2012; Kacperczyk and Balachandran 2018). I interact those measures with FWTAs in some model specifications.

I also control for workers' level of education and managerial status because higher education and managerial experience in certain occupations increase workers' general human capital, which creates more alternative job opportunities. It is expected that workers with university degrees are more likely to leave establishments than workers with within-firm vocational training that increases workers' firm-specific human capital (Mincer 1988; Royalty 1998). In addition, I control for German citizenship because foreign workers are more likely to return to their home country, which also leaving the organization.

In the regressions using the sample of women, I create a *mother with a young child* dummy measuring if a woman is between 20-45 years old and was on leave at some point during the past three years. [17] It is expected that this variable will be positively correlated with turnover because women usually experience career interruptions after childbirth. To investigate if flexible working time arrangements reduce the probability of this vulnerable group of workers leaving the organization, I interact the mother of young children dummy variable with FWTAs in some model specifications.

Lastly, I control for establishment size because workers in larger establishments should be less likely to leave the organization than workers in smaller organizations (Oslund 2019). I control for an organizational restructuring dummy because workers in establishments that closed down, relocated, or separated and continued as an independent business are more likely to leave the establishments, perhaps to avoid a future layoff. Descriptive statistics of these variables are presented in Appendix Table A3.

To address unobserved heterogeneity across establishments that may be correlated with the adoption of flexible working time arrangement, I include establishment fixed effects that accounts for time-invariant establishment-level factors that are correlated with worker turnover. Thus, the estimates identify the effects of adopting flexible working

[17] LIAB does not contain information about the number of children. I only observe whether a woman goes on leave of absence, but cannot distinguish between maternity leave and other leave-taking, such as sick leave, sabbaticals, or disability leave (Schönberg and Ludsteck 2014). During the leave periods, the employment relationship continues to exist in legal terms, but without pay. For workers on leave, a daily wage reported as 0 euros can be put down to "employment interruption notifications." To estimate the percentage of leave-taking that involves maternity leave, Schönberg (2009) supplemented the social security 1% sample with precise information about childbirth. She shows that the share of "correct" leave spells increases if the age restriction is made. For example, she finds that with no restriction, only 55.37% of all leave spells for West German women are due to childbirth, but the share increased by about 20% if the sample is restricted to women of child-bearing age, between 18 and 40. The "mother with a young child" variable is therefore somewhat noisy, but provides a conservative estimate of the effect of FWTA for mothers.

time arrangements, after accounting for firm-specific effects such as region, industry, works council, or collective bargaining arrangements. I control for year fixed effects to absorb common shocks that are the same across all workplaces in a given year, such as the broader business cycle and changes in national policies on work family or employment laws. All estimated standard errors are robust and clustered at the establishment level because cluster-specific fixed effects may not fully control for within-cluster correlations of standard error (Cameron and Miller 2015).

<Insert Table 2 about here>

## Results

### Selective Adoption

Because most of existing studies investigating the effects of FWTA on turnover do not account for the heterogeneity across the establishments that may bias estimates, I am doing a selection analysis to reveal the selection bias in previous studies and organizations' motivation in adopting FWTA. Figure 1 shows FWTA adoption rate by year and industry. Panel A shows that the percentage of establishments with a flextime model with working time accounts available increased from 49% in 2002 to 60% in 2012. The percentage of establishments with trust-based working time arrangements increased from 19% in 2004 to 30% in 2008, but it remained stable between 2008 and 2012. The start of the global economic and financial crisis in 2008 probably explains the stagnation of TBWT adoption. Another possibility is that after 2008, establishments might have already reached the full potential of TBWT and could not identify further employees whose jobs could permit such extensive working time autonomy.

Figure 1 panel B shows that trust-based working time arrangements are most likely to be adopted in high-skill and high-wage industries, such as communications, finance and banking, education, and industrial service industries and least likely to be adopted in low-skill and low-wage industries, such as retail and construction. In contrast, flextime models with working time accounts are more likely to be adopted in NGO/public administration, agriculture and mining, manufacturing, and construction industries. For example, in manufacturing, most workers work full-time and therefore accumulate overtime hours in working time accounts that are suitable instruments for varying working hours. Similarly, flextime models with working time accounts are used in the construction industry when the loss of working hours caused by bad weather needs to be at least partially compensated by accumulated hours (Herzog-Stein and Zapf 2014).

<Insert Figure 1 about here>

Other differences between FWTA adopters and non-adopters are presented in Appendix Table A4. The raw comparison shows that compared to non-adopters, flexible working time arrangements' adopters are larger firms that pay higher wages, have longer worker tenure, and are more likely to have works councils and be covered by collective bargaining agreements. Trust-based working time arrangements adopters have a higher percentage of university-educated workers than non-adopters do, while flextime model adopters have a higher percentage of workers with vocational training than flextime non-adopters.

Table 3 reports the results of flexible working time arrangements adoption models, which estimate the likelihood of adopting flexible working time arrangements controlling for industry, region, and year confounders. I find that within the same

*industry, federal state, and year*, establishments with a higher share of university-educated workers and establishments that pay higher wages and have higher worker tenure are more likely to adopt trust-based working time arrangements. Specifically, Model 4 suggests that a 10 percent increase in the percentage of university-educated workers in the establishment is estimated to increase the probability of adopting TBWT by 1.98 (0.1*0.198*100) percentage points. A ten euro increase in the average daily wage in the establishment is estimated to increase the probability of adopting TBWT by 1.7 (10*0.0017*100) percentage points.

In addition, the existence of works councils and collective bargaining arrangements are positively associated with adopting flextime model with working time accounts, but not correlated with adopting trust-based working time arrangements. Compared to workplaces without works councils, the probability of adopting a flextime model with WTA is 5.42 percentage points higher in establishments with works councils. Similarly, the probability of adopting a flextime model with WTA is 7 percentage points higher in establishments covered by collective bargaining arrangements than those that are not covered. The presence of trust-based working time arrangements is not associated with the presence of these voice channels since unions and works councils concerns about the blurred boundary of workers' work and family lives and increased work intensification (Beckmann and Hegedues 2011).

Most interestingly, the analysis suggests that the share of women in the establishment is not associated with the adoption of flexible working time practices, but establishments' instability rates are positively associated with the adoption of both flexible working time practices. For instance, a change in the instability rate by 10 is

estimated to increase the probability of adopting both types of flexible working time practices by 3.3 (10*0.0033*100) percentage points. These results suggest that women's work-family concerns may not be the driving forces that facilitate adoption of flexible working time arrangements. Rather, flexible working time options are offered as a mean of securing the stability of internal labor markets.

<Insert Table 3 about here>

**Post-Adoption Effects on Turnover**

Summary statistics in Table 4 contain descriptive statistics on how employee and establishment characteristics are associated with employee mobility. The results are largely consistent with the predictions in the turnover literature. In the pooled individual sample, 14% of the men and 17% of women leave the organization within one year. In general, there is a U-shaped relationship between workers' age and turnover: the likelihood of mobility at first decreases as workers get older, but the likelihood of mobility gets higher as workers reach retirement age. In addition, the data suggests that motherhood is a critical life event in German women's employment careers. Sixty-five percent of mothers of young children (20 to 45-year-old women who were on leave in the past three years) leave the organization within one year. This statistics fits findings in other studies of German women's careers after childbirth (Fitzenberger, Steffes, and Strittmatter 2016; Arntz, Dlugosz, and Wilke 2017).

In addition, workers' employment status affects the likelihood of turnover. For both men and women, marginal part-time workers and workers in partial retirement are more likely to leave the organization than full-time workers. As predicted in the literature, while part-time men are more likely to leave the organization compared to full-

time men, part-time women are less likely to leave the organizations compared to full-time women. This finding may suggest that compared to men, women are more likely to voluntarily work part-time (Dunn 2018; Booth and van Ours 2013) or be pushed to work part-time by a dominant cultural ideology to combine responsibilities in the household and employment (Collins 2018).

Furthermore, the relative wage is negatively correlated with turnover for both men and women. Twenty-four percent of men whose wage is below the 30$^{th}$ percentile within the establishment leave the organization within one year. In comparison, only 10% of men whose wage is above the 70$^{th}$ percentile within the establishment leave the organization within one year. Workers who received in-firm vocational trainings are less likely to leave the organization than workers without training or workers with a university degree. Worker voice institutions, such as works councils and collective bargaining agreements, are negatively associated with turnover. As expected, workers in organizations that experienced restructuring are more likely to leave the organizations than their counterparts in other organizations. These individual and organizational characteristics that predict worker turnover are controlled in the regressions.

<Insert Table 4 about here>

Table 5 presents baseline regression results (without interaction terms) testing whether flexible working time arrangements reduce worker turnover. All coefficients of FWTAs are small and not statistically significant. The results do not support the claim that adopting flextime or trust-based working time reduce turnover for all workers. The relationship of the control variables to turnover observed is broadly consistent with extant turnover literature and the pattern showing in the descriptive statistics.

<Insert Table 5 about here>

Table 6 and 7 present the results of gendered life-course hypotheses of FWTAs' effects on turnover. Table 6 allows interaction between FWTA and the mothers of young children dummy variable. Table 7 allows interaction between FWTA and age as categorical variables; The results suggest that both flextime and trust-based working time arrangements reduce the probability of exiting the establishment for mothers with young children as well as young men and women. Results in Table 6 suggests adopting both flexible working time arrangements reduces the likelihood of mothers of young children leaving the organization. Specifically, adopting a flextime model with working time accounts (trust-based working time arrangements) significantly reduced the probability of mothers with young children leaving the establishment, by 4.8 percentage points, and adopting a trust-based working time arrangements reduce the probability of mothers with young children leaving the establishments by 4.23 percentage points. This finding suggests that flexible working time arrangements are effective tools for retaining mothers with young children and minimizing their employment interruption.

<Insert Table 6 about here>

Results in Table 7 shows that for men between 20 and 30 years old, a flextime model with WTA reduces the probability that they leave the establishment by 1.25 (0.0101-0.0226*100) percentage points, and trust based working time arrangements reduce the probability that they leave the establishment by 1.16 percentage points ($p<0.01$). This result may suggest reflect young men's increasing involvement with care responsibilities or young workers' broader preference for flexibility and autonomy.

For women between 20-30 years old, the flextime model reduces the probability of leaving the establishment by 1.75% points, and trusted based working time arrangements reduce the probability of leaving by 1.41% points. However, the effects of FWTAs on turnover are mitigated as workers get older. A flextime model with working time accounts increases the probability of leaving for men above 50 years old, which suggests that some men may accumulate large amount of hours in their working time accounts and use them for early retirement.

<Insert Table 7 about here>

## Conclusion

The aim of this study is to investigate the effects of flexible working time arrangements (FWTA) on worker turnover. Using a nationally representative sample of employers and workers, I find that while adopting FWTAs does not reduce overall employee turnover, it reduces the probability of specific worker populations exiting the establishment: both young men and women, mothers with young children, and low-wage workers in establishments. These results suggest that providing flexible working time policies is not a panacea for retaining all workers, but such policies retain workers that are most in need of them. The policies can play an important role in stabilizing the employment of lower-wage workers and helping young workers develop their human capital. Further, by addressing mothers' needs at a critical period in their lives, flexible working time policies may reduce the gender pay gap by encouraging women to both remain in the labor force and continue building their careers in a given establishment.

This paper makes important theoretical and policy contributions. First, the paper contributes to the comparative literature on work and family research by showing that

even in countries with supportive work-family policies, employers' flexible working time arrangements still help retain young workers and mothers of young children. The findings on young workers may suggest young workers' broad interests in flexible work options and/or fathers' increasing engagement in childcare. The findings on mothers have important policy implications since fewer German mothers go back to work after childbirth compared to women in other industrialized countries (Gangl and Ziefle 2009). The long time-out periods and job changes destabilize German women's careers and contribute to the large motherhood wage penalty (Kleven et al. 2019). This paper shows that flexible working time options can play an important role in promoting women's employment and, perhaps, over time, reducing the gender pay gap.

In addition, the effects of flexible work practices on lower-wage workers have been rarely studied in previous literature. Work and family research has primarily focused on the work and family needs of professional and higher-wage workers, in part, because family-friendly policies are unevenly distributed across workplaces and often unavailable to low-wage workers. Most lower-wage workers experience high turnover rates and lack the autonomy enjoyed by higher-wage workers to shift their work schedules to accommodate family responsibilities and needs for personal development. The results of this study suggest the possibility that organizations can redesign work schedules so that they improve work-life fit for low-wage workers and stabilize their employment.

Furthermore, it is interesting that type of flexible working time policy does not seem to be critical to their effects on worker turnover. Different kinds of organizations adopt such policy but their effects are similar. The policy implementation of that finding

is that we can do different kind of flexible working time arrangements for different industries or organizations and still see benefit of reduced turnover for certain group of employees.

The study has limitations that call for caution in the interpretation of its findings and point to the need for additional research in the future. First, this study focuses on the effects of flexible working time practices' *availability*. Future studies should investigate how the use and implementation of these flexible working time arrangements affect worker turnover across differences in gender, parental status, and wage levels. Second, the inclusion of establishment fixed effects help me rule out the possibility that establishment adopting flexible working time arrangement may generally be better workplaces, even without FWTA. However, the use of fixed effects cannot eliminate the possibility that an establishment adopts other policies or experiences other shocks that affect worker retention and are unobservable to researchers.

In addition, although the turnover measure from social security records is highly reliable, the reason of the turnover is not observable. The worker exit measure used in this study cannot distinguish between voluntary and involuntary turnover or between job-to-job transitions and job-to-unemployment/non-employment transitions (Heavey, Holwerda, and Hausknecht 2013; Hom, Mitchell, and Lee 2012). Previous research has shown that although women are more likely to leave a job for non-employment, men are more likely to move from one job to the next (Royalty 1998) and enjoy higher wages with a job change (Topel and Ward 1992). Future studies should investigate whether flexible working time arrangements reduce voluntary turnover and job-to-unemployment/non-employment transitions as those outcomes could shed light on how

flexible working time arrangements affect women's labor force attachment and gender inequality. Another direction for future research is investigating if certain groups of workers are more likely to "chase" flexibility by entering organizations with family-friendly policies and whether such moves support or dampen wage attainment.

As noted throughout this paper, it is important to situate predictions about the effects of different flexible working time policies in their institutional and national contexts. Whether the effects observed here generalize to contexts outside of Germany is an issue for further research. The effects of organizational flexible working time arrangements are expected to have *greater* effects on worker turnover in liberal welfare states with less supportive national work-family policies.

Moreover, in settings with weak worker representation and minimal trust between management and labor, workers may have less control over how the hours accumulated in their working time accounts (called *comp time* in the U.S.) could be used. For example, in 2017, there was a proposal in the United States to give workers the opportunity to exchange compensatory time off in lieu of overtime payments for extra hours worked. The Republican-sponsored Working Families Flexibility Act sought to allow private sector to substitute comp time (time off) for overtime compensation for employees (Congress.gov 2017). The Act was pushed by people who want to give employers more discretion to lower employment costs rather than implementing a sustainable flexible working time system that balance the needs of employers and workers. The primary concern of the labor groups was the significant erosion in overtime protections for workers. Union leaders do not think that the choice of time vs. money would be experienced as a truly free choice because US workers lack sufficient voice and

representation at workplaces to ensure that they would be able to access their accrued time balances reliably. Without worker representation and mutual trust between management and labor, there is a fear that employers, rather than workers, are likely to control when and how the comp time could be used (National Partnership for Women and Families 2017; and also previously Walsh 1999; Golden 2003, 2005). The adoption of different flexible working time arrangements and their effects on worker turnover should be investigated in other settings that involve different work-family policies, industrial relations structures, and labor-management relations to fully understand the promise and perils of new working time arrangements.

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## Tables and Figures

### Table 1. Benefits and Risks of Flextime Model with WTA and TBWT

| | | Flextime model with working time accounts (WTA) | Trust-based working time arrangements (TBWT) |
|---|---|---|---|
| Benefit | Autonomy & work-life balance | Higher relative to standard work schedule; Lower than TBWT | Higher relative to standard work schedule; Higher than WTA |
| | Protect employment during economic downturn | Yes | No |
| Risk | Controlled by management | Maybe | No |
| | Induce overwork | Maybe | Maybe |

## Table 2. Definition of Variables

| Variable | Description |
|---|---|
| **Panel A: Adoption Analysis** | |
| Adoption | Establishment *j* will adopt a certain type of flexible working time practices f in future (0, 1) |
| Share of women | Share of women in establishment j (0-1) |
| Share of university educated | Share of university-educated workers in establishment j (0-1) |
| Share of workers with vocational training | Share of workers with within-firm vocational training in establishment j (0-1) |
| Average wage | Average daily wage of workers in establishment j |
| Average tenure | Average years of tenure of workers within establishment j |
| Instability rate (%) | (Number of workers left establishment j between year t and t+1/total number of workers in establishment j at year t)*100 |
| Establishment size | Number of workers in establishment j |
| Collective bargaining arrangement | Dummy coded one if establishment j is covered by sectoral or firm collective bargaining agreements |
| Works council | Dummy coded one if establishment j has a works council |
| **Panel B. Impact Analysis** | |
| Exit | A dummy variable that equals one if a person left the establishment between June 30 year t and June 30 year t+1 |
| FWTA | A dummy variable that equals one if the establishment has a certain type of flexible working time arrangement on June 30 at year t |
| Age and its square | Age is constructed as the difference between the current year and workers' year of birth. |
| Tenure and its square | Workers' tenure in the establishment (measured in years) |
| Education | Education is a categorical variable that equals one if a worker does not have vocational training, two if the worker received vocational training in the firm, three if the worker has a university degree. |

| | |
|---|---|
| Manager dummy | Following Jäger and Heining (2019), I classify workers as managers or supervisors if they work in an occupation requiring "complex specialist activities" (requirement level 3) or "highly complex activities" (requirement level 4). These occupations are characterized by managerial, planning, and control activities, such as operation and work scheduling, supply management, and quality control and assurance. They typically require a qualification as master craftsperson, graduation from a professional academy, or university studies. |
| German | Dummy coded one if the worker is German citizen |
| Daily wage | Daily wage of the employees. The variable is rounded into integer Euro values. I deflate the wage using the annual consumer price index of all items in Germany. |
| High-, medium-, and low-wage workers | Dummies indicating individual's wage in relation to the overall wage distribution within the establishment. Low-wage workers are individuals whose wage is below the $30^{th}$ percentile of the wage distribution within the establishment; medium-wage workers are individuals whose wage is between the $30^{th}$ and70th percentile, and high-wage workers are individuals whose wage is above the 70th percentile of the establishment's wage distribution. |
| Wage censored | Dummy coded one if the wage is top-censored |
| Employment status | Employment status is a categorical variable that equals one if the worker works full-time, two if the worker work part-time, three if the worker is marginally employed, and four if the worker is in partial retirement. |
| Mother of young children | As shown by Schönberg (2009), the vast majority of leave-taking spells (daily wage recorded as zero) for women of childbearing age are due to maternity leave. Mother of young children is a dummy variable that equals one if a women aged 20 to 45 had a period with zero wages in any of the recent three years. It equals zero otherwise. |
| Total employment | Number of workers in establishment j |

| | |
|---|---|
| Organization restructure | In the establishment panel, the respondents were asked whether "part of the establishment were closed down, relocated, or separated and continued as independent business in the past year." I create a dummy variable, *Organization Restructure,* that equals one if the establishment experienced any of these event in the past year and is zero otherwise. I control for one-year lead of this variable, measuring whether the establishment experienced restructure in the current year. |

## Table 3. FWTA Selective Adoption Regressions

| | Y=Adopting flextime model with working time accounts | | Y=Adopting trust-based working time arrangements | |
|---|---|---|---|---|
| | M1 | M2 | M3 | M4 |
| Share of vocationally trained (0-1) | 0.123*** | 0.05 | 0.02 | 0.02 |
| | (0.04) | (0.04) | (0.03) | (0.03) |
| Share of university educated (0-1) | -0.01 | -0.11 | 0.152** | 0.198*** |
| | (0.07) | (0.08) | (0.07) | (0.07) |
| Average daily wage (euro) | 0.00 | 0.00 | 0.00199*** | 0.00170*** |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Average tenure (year) | 0.00 | 0.00 | 0.00 | 0.00372* |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Share of women (0-1) | -0.05 | -0.02 | 0.0834*** | 0.03 |
| | (0.05) | (0.06) | (0.03) | (0.04) |
| Instability rate (0-100) | 0.00318*** | 0.00332*** | 0.00351*** | 0.00331*** |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Number of workers (1000 people) | -0.02 | -0.04 | 0.02 | 0.01 |
| | (0.04) | (0.04) | (0.01) | (0.01) |
| Works council | 0.0775*** | 0.0542** | -0.02 | -0.02 |
| | (0.03) | (0.03) | (0.02) | (0.02) |
| Collective bargaining agreement | 0.0505** | 0.0705*** | 0.01 | 0.00 |
| | (0.02) | (0.02) | (0.02) | (0.02) |
| Constant | 0.108** | 0.117** | -0.02 | 0.02 |
| | (0.05) | (0.05) | (0.04) | (0.04) |
| Fixed effects specification (Industry × year × federal state) | No | Yes | No | Yes |
| Observations | 10795 | 10792 | 27457 | 27456 |

OLS regressions. Clustered standard errors in parentheses. Pooled establishment sample 2002, 2004, 2006, 2008, 2010, and 2012. Post-adoption observations are excluded from the analysis. The industry variable is based on NACE-2 classification (WZ-93 2 digit level). Weighted by cross-section sampling weights. * p <0.1, ** p <0.05, *** p < 0.01.

**Table 4: Probability of Leaving the Establishment (from t to t+1) for Each Group**

| Variables | All | | Men | | Women | |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD |
| All | 0.15 | 0.36 | 0.14 | 0.34 | 0.17 | 0.37 |
| Flex any | 0.14 | 0.35 | 0.13 | 0.33 | 0.16 | 0.36 |
| Flextime model with working time accounts | 0.14 | 0.34 | 0.13 | 0.33 | 0.15 | 0.36 |
| Trust based working time | 0.14 | 0.35 | 0.13 | 0.33 | 0.17 | 0.37 |
| Age 20-30 | 0.28 | 0.45 | 0.26 | 0.44 | 0.30 | 0.46 |
| Age 30-40 | 0.15 | 0.36 | 0.13 | 0.33 | 0.18 | 0.39 |
| Age 40-50 | 0.10 | 0.30 | 0.09 | 0.29 | 0.11 | 0.31 |
| Age 50+ | 0.13 | 0.34 | 0.13 | 0.34 | 0.14 | 0.34 |
| Mother of young children | 0.65 | 0.48 | NA | NA | 0.65 | 0.48 |
| Full time | 0.13 | 0.33 | 0.12 | 0.32 | 0.15 | 0.36 |
| Part time | 0.15 | 0.35 | 0.23 | 0.42 | 0.13 | 0.34 |
| Marginal part-time | 0.31 | 0.46 | 0.35 | 0.48 | 0.30 | 0.46 |
| Partial retirement | 0.20 | 0.40 | 0.22 | 0.41 | 0.19 | 0.39 |
| Wage <30% | 0.23 | 0.42 | 0.24 | 0.43 | 0.21 | 0.41 |
| Wage [30%-70%] | 0.13 | 0.33 | 0.12 | 0.32 | 0.14 | 0.35 |
| Wage >70% | 0.10 | 0.30 | 0.10 | 0.30 | 0.12 | 0.32 |
| Wage censored | 0.09 | 0.28 | 0.09 | 0.28 | 0.11 | 0.31 |
| No training | 0.19 | 0.40 | 0.19 | 0.40 | 0.19 | 0.40 |
| Vocational training | 0.12 | 0.33 | 0.11 | 0.32 | 0.14 | 0.35 |
| University | 0.14 | 0.35 | 0.12 | 0.32 | 0.17 | 0.38 |
| Tenure <1 year | 0.39 | 0.49 | 0.39 | 0.49 | 0.38 | 0.49 |
| Tenure 1-3 years | 0.22 | 0.41 | 0.20 | 0.40 | 0.23 | 0.42 |
| Tenure 3-6 years | 0.14 | 0.35 | 0.13 | 0.33 | 0.16 | 0.36 |
| Tenure 6-10 years | 0.09 | 0.29 | 0.08 | 0.27 | 0.11 | 0.31 |
| Tenure >=10 years | 0.07 | 0.26 | 0.07 | 0.25 | 0.08 | 0.27 |
| Manager | 0.14 | 0.35 | 0.12 | 0.33 | 0.18 | 0.38 |
| Establishment size <=100 | 0.17 | 0.37 | 0.16 | 0.36 | 0.18 | 0.38 |
| Establishment size 100-500 | 0.15 | 0.36 | 0.14 | 0.35 | 0.16 | 0.37 |
| Establishment size 500-2000 | 0.13 | 0.33 | 0.11 | 0.32 | 0.15 | 0.35 |
| Establishment size >2000 | 0.11 | 0.32 | 0.09 | 0.29 | 0.16 | 0.37 |
| Works council | 0.12 | 0.33 | 0.11 | 0.31 | 0.14 | 0.35 |
| No works council | 0.20 | 0.40 | 0.20 | 0.40 | 0.20 | 0.40 |
| Collective bargaining arrangement (CBA) | 0.14 | 0.35 | 0.13 | 0.34 | 0.16 | 0.36 |
| No CBA | 0.17 | 0.38 | 0.16 | 0.37 | 0.18 | 0.39 |
| Organization restructure | 0.21 | 0.40 | 0.20 | 0.40 | 0.21 | 0.41 |

Pooled individual sample 2002, 2004, 2006, 2008, 2010, and 2012.Weighted by cross-section sampling weights.

## Table 5. Flexible Working Time Arrangements' Effects on Turnover (Y=Exit)

| | M1 | M2 | M3 | M4 | M5 | M6 |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Flex any | -0.001 | -0.002 | | | | |
| | (0.002) | (0.003) | | | | |
| Flextime model with working time accounts | | | -0.001 | -0.002 | | |
| | | | (0.003) | (0.003) | | |
| Trust-based working time | | | | | -0.001 | 0.003 |
| | | | | | (0.002) | (0.002) |
| Employment status (*ref. full time*) | | | | | | |
| Part-time | 0.0115*** | -0.0240*** | 0.0116*** | -0.0240*** | 0.00861** | -0.0232*** |
| | (0.004) | (0.002) | (0.004) | (0.002) | (0.004) | (0.002) |
| Marginal part-time | 0.0102* | 0.0192*** | 0.00959* | 0.0191*** | 0.0174*** | 0.0207*** |
| | (0.006) | (0.004) | (0.006) | (0.004) | (0.006) | (0.004) |
| Partial Retirement | 0.104*** | 0.0649*** | 0.103*** | 0.0650*** | 0.101*** | 0.0726*** |
| | (0.003) | (0.004) | (0.003) | (0.004) | (0.003) | (0.004) |
| Manager | 0.0237*** | 0.0251*** | 0.0236*** | 0.0250*** | 0.0229*** | 0.0254*** |
| | (0.002) | (0.002) | (0.001) | (0.002) | (0.002) | (0.002) |
| Age (*0.001) | -20.76*** | -24.98*** | -20.78*** | -24.96*** | -19.72*** | -24.61*** |
| | (0.417) | (0.486) | (0.417) | (0.485) | (0.444) | (0.522) |
| Age square (*0.001) | 0.238*** | 0.271*** | 0.239*** | 0.271*** | 0.224*** | 0.264*** |
| | (0.005) | (0.006) | (0.005) | (0.006) | (0.005) | (0.006) |
| Tenure (*0.001) | -14.05*** | -14.95*** | -14.05*** | -14.95*** | -13.90*** | -14.62*** |
| | (0.292) | (0.306) | (0.292) | (0.306) | (0.300) | (0.327) |
| Tenure square (*0.001) | 0.376*** | 0.412*** | 0.376*** | 0.412*** | 0.366*** | 0.397*** |
| | (0.008) | (0.010) | (0.008) | (0.010) | (0.008) | (0.010) |
| Education (*ref. without vocational training*) | | | | | | |
| Vocational training | -0.0165*** | -0.0144*** | -0.0164*** | -0.0143*** | -0.0160*** | -0.0151*** |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| University | -0.003 | 0.0129*** | -0.003 | 0.0128*** | -0.002 | 0.0131*** |
| | (0.002) | (0.003) | (0.002) | (0.003) | (0.003) | (0.003) |
| Daily wage (*0.001) | -1.199*** | -1.107*** | -1.197*** | -1.106*** | -1.130*** | -1.064*** |
| | (0.028) | (0.030) | (0.028) | (0.030) | (0.030) | (0.032) |
| Wage censored | 0.0524*** | 0.0569*** | 0.0523*** | 0.0570*** | 0.0517*** | 0.0589*** |
| | (0.002) | (0.003) | (0.002) | (0.003) | (0.002) | (0.004) |
| Firm size (1000 workers) | 0.013 | 0.025 | 0.013 | 0.025 | 0.017 | 0.031 |
| | (0.01) | (0.02) | (0.01) | (0.02) | (0.02) | (0.02) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Organization restructure | 0.0625*** | 0.0534*** | 0.0625*** | 0.0535*** | 0.0568*** | 0.0519*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| Mother with young children | | 0.411*** | | 0.412*** | | 0.407*** |
| | | (0.01) | | (0.01) | | (0.01) |
| Constant | 0.725*** | 0.829*** | 0.725*** | 0.828*** | 0.695*** | 0.812*** |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) |
| Establishment FE | YES | YES | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES | YES | YES |
| Observations | 5,187,785 | 3,132,858 | 5,186,400 | 3,131,969 | 4,197,787 | 2,515,639 |

* p <0.1, ** p <0.05, *** p < 0.01. OLS regression models weighted by cross-section sampling weights. Robust standard errors clustered by establishment in parentheses.

**Table 6. Flexible Working Time Arrangements' Effects and Mother of Young Children**
**(Y=Exit)**

| | M1 | M2 | M3 |
|---|---|---|---|
| Flex any | -0.00124 | | |
| | (0.00) | | |
| Mother of young children | 0.445*** | 0.439*** | 0.421*** |
| | (0.01) | (0.01) | (0.01) |
| Mother of young children × Flex any | -0.0478*** | | |
| | (0.01) | | |
| Flextime model with WTA | | -0.00132 | |
| | | (0.00) | |
| Mother of young children × Flextime model with WTA | | -0.0438*** | |
| | | (0.01) | |
| Trust-based working time | | | 0.00308 |
| | | | (0.00) |
| Mother of young children × Trust-based working time | | | -0.0423*** |
| | | | (0.01) |
| Constant | 0.828*** | 0.828*** | 0.812*** |
| | (0.02) | (0.02) | (0.02) |
| Establishment FE | YES | YES | YES |
| Year FE | YES | YES | YES |
| Observations | 3,132,858 | 3,131,969 | 2,515,639 |

* p <0.1, ** p <0.05, *** p < 0.01. OLS regression models weighted by cross-section sampling weights. Robust standard errors clustered by establishment in parentheses. All models control for employment status, tenure, tenure squared, education dummies, daily wage, wage censored dummy, establishment size, and organizational restructure.

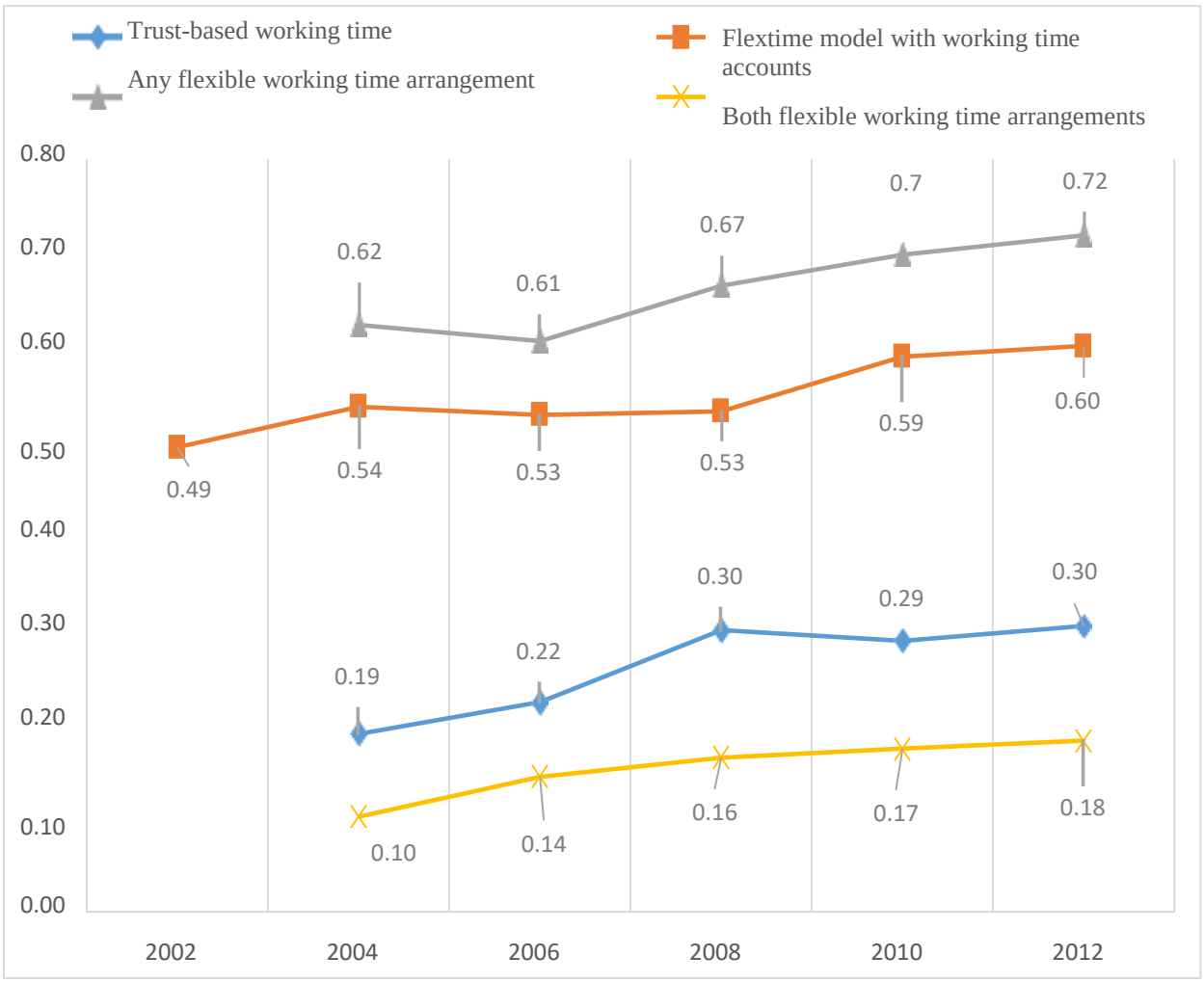
**Table 7. Flexible Working Time Arrangements' Effects on Turnover and Age (Y=Exit)**

| | M1 | M2 | M3 | M4 | M5 | M6 |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Age group *(ref. Age 50+)* | | | | | | |
| Age 20-30 | 0.0594*** | 0.110*** | 0.0580*** | 0.110*** | 0.0495*** | 0.108*** |
| | (0.005) | (0.004) | (0.004) | (0.004) | (0.003) | (0.003) |
| Age 30-40 | 0.002 | 0.0326*** | 0.00615** | 0.0379*** | -0.001 | 0.0377*** |
| | (0.003) | (0.004) | (0.003) | (0.003) | (0.002) | (0.002) |
| Age 40-50 | -0.00704** | -0.0173*** | -0.00526** | -0.0151*** | -0.0101*** | -0.0157*** |
| | (0.003) | (0.003) | (0.002) | (0.002) | (0.002) | (0.002) |
| Flex any | 0.00711** | 0.000 | | | | |
| | (0.003) | (0.003) | | | | |
| Age 20-30 × Flex any | -0.0223*** | -0.0178*** | | | | |
| | (0.005) | (0.005) | | | | |
| Age 30-40 × Flex any | -0.00908** | 0.002 | | | | |
| | (0.004) | (0.004) | | | | |
| Age 40-50 × Flex any | -0.00725** | -0.001 | | | | |
| | (0.003) | (0.003) | | | | |
| Flextime model with WTA | | | 0.0101*** | 0.003 | | |
| | | | (0.003) | (0.003) | | |
| Age 20-30 × Flextime model with WTA | | | -0.0226*** | -0.0205*** | | |
| | | | (0.005) | (0.005) | | |
| Age 30-40 × Flextime model with WTA | | | -0.0156*** | -0.00639* | | |
| | | | (0.003) | (0.004) | | |
| Age 40-50 × Flextime model with WTA | | | -0.0105*** | -0.004 | | |
| | | | (0.003) | (0.003) | | |
| Trust-based working time | | | | | -0.002 | 0.002 |
| | | | | | (0.003) | (0.003) |
| Age 20-30 × Trust-based working time | | | | | -0.00959** | -0.0161*** |
| | | | | | (0.004) | (0.005) |
| Age 30-40 × Trust-based working time | | | | | 0.004 | 0.006 |
| | | | | | (0.003) | (0.004) |
| Age 40-50 × Trust-based working time | | | | | 0.00476** | 0.002 |
| | | | | | (0.002) | (0.003) |
| Constant | 0.321*** | 0.334*** | 0.319*** | 0.332*** | 0.307*** | 0.322*** |
| | (0.015) | (0.012) | (0.015) | (0.012) | (0.020) | (0.014) |
| Establishment FE | YES | YES | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES | YES | YES |
| Observations | 5,459,466 | 3,393,769 | 5,457,959 | 3,392,770 | 4,426,036 | 2,731,826 |

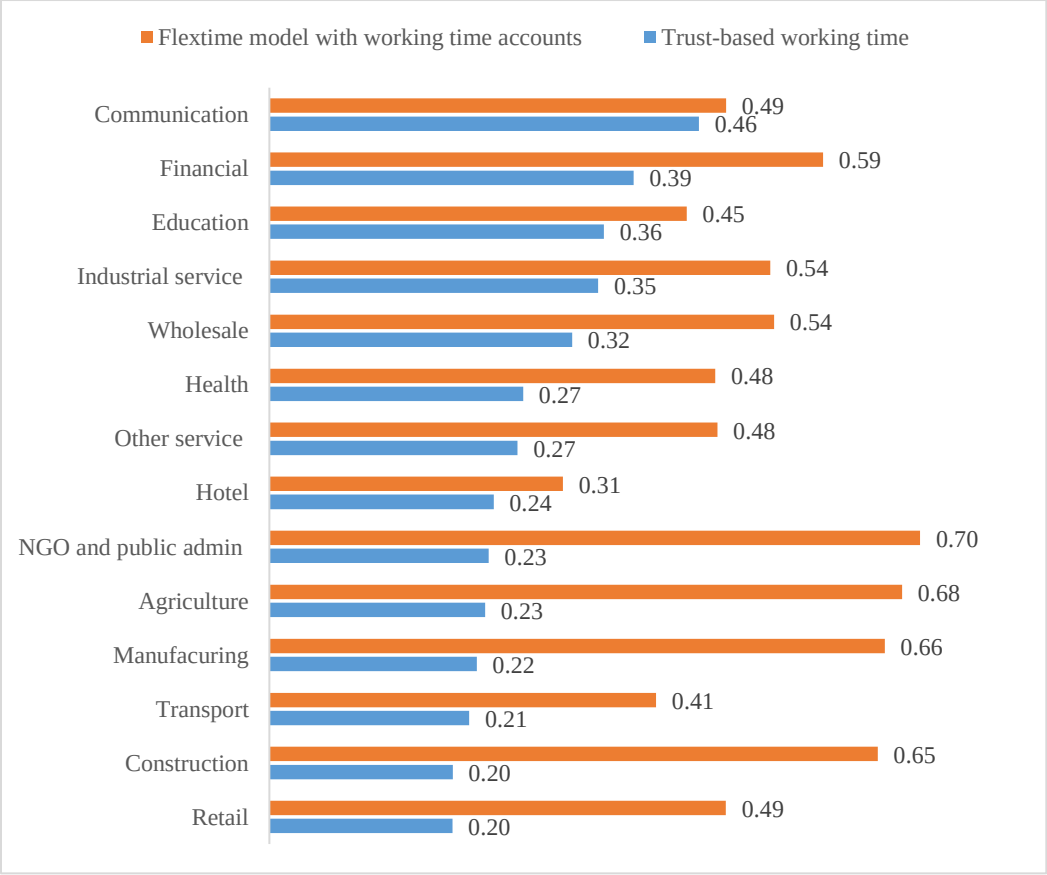
* p <0.1, ** p <0.05, *** p < 0.01. OLS regression models weighted by cross-section sampling weights. Robust standard errors clustered by establishment in parentheses. All models control for employment status, tenure, tenure squared, education dummies, daily wage, wage censored dummy, establishment size, and organizational restructure.

**Figure 1. Percentage of Establishments Covered by Flexible Working Time Arrangements**

**Panel A. By Year**



**Panel B. By Industry**



## Appendix

### Table A1: National-Level Family Policies in Germany

| | | |
|---|---|---|
| Working Hours | Normal working hours | The working time of workers is legally regulated by the Working Hours Act (Arbeitszeitgesetz, ArbZG). The Working Hours Act sets a legal framework for the maximum number of hours worked and states a working time of 8 hours a day. However, if in the course of six months the daily working hours do not exceed 8 hours on average, the daily working time can be extended to ten hours per day. Legislation sets maximum hours (48 hours per week) but not normal working time. The regulation of working time is primarily through collective agreements. |
| | Part-time work | German employment law has a long tradition of granting workers the right to work part-time under specific conditions (e.g., the right to take temporary parental leave under the German Act on Parental Allowance and Parental Leave or to temporarily reduce working hours in order to care for relatives under the German Home Care Leave Act and the German Family Care Act). The 1997 EU Directive on Part-Time Work sought to eliminate discrimination against part-time workers and urged the member countries to eliminate obstacles that limit opportunities for part-time work (Gornick and Heron 2006). The EU Directive was implemented in Germany in 2001. Employers with fifteen or more employees have to allow employees to reduce their hours (after six months of employment), unless there are justifiable "business reasons" for rejecting the request (Gornik and Meyers 2003). This legally enforceable right is further reinforced by collective agreements that regulate various sectors in the German labor market and determine the conditions for employers' rejection of workers' requests. Part-time workers may request an increase to full-time work and should generally be given preference over other applicants unless there are compelling business reasons otherwise. |
| Family leave policies | Maternity leave benefit | 14 weeks. 100 percent of wage. |

| | | |
|---|---|---|
| | Parent leave benefits | Parents in Germany can share three years of job-protected leave. Before the 2007 parental leave reform, the parents on leave was given two benefit options. They could either get 450 Euro/month for the first 12 months immediately following childbirth or get 300 Euro/month for the first 24 months following childbirth. The 2007 reform replaced a previous means-tested, flat-rate child-raising benefit (Erziehungsgeld) with "parental money" (Eltergelt). The new "parental money" replaces 67% of previous net labor earnings —i.e., with respect to the average during the 12 months before birth of the child— for up to 12 months after the birth of the child. The monetary limits of the benefits are a minimum payment of 300 Euros/month and a maximum payment of 1800 Euros per month. |
| | Leave for family reasons | Parents are entitled to paid time off to care for sick children under age twelve. The benefit is 100 percent of earnings. Working adults in two-worker families may take ten days per year per child (up to a maximum of twenty-five days); single parents may take twenty days per child (up to a maximum of fifty days) per year. |
| | Paternity leave benefits | No paternity leave benefits before 2007. After the 2007 reform, if both father and mother take up the transfer, they can receive additional months of wage compensation ("daddy months"), and the resulting total of 14 months can be freely distributed between the two parents. |
| | Family leave financing | Funded through health-care insurance fund contributed by employers, employees, and the government. Employers pay a substantial share as they are required to "top up" the public benefit. |
| Public Childcare coverage | | In the mid-2000s, the government started to implement a major childcare expansion aimed at speeding up mothers' returns to employment. The 2004 Day Care Extension Act (Tagesbetreuungsaubaugesetz-TAG) stated that a sum of 1.5 billion Euros yearly has to be invested in childcare by local authorities. The 2008 Child and Youth Welfare Act (Kinderforderungsgesetz) further stipulates a legal right to a daycare spot for all children aged one year or over starting August 1, 2013 (Schober and Stahl 2014 2016). |

## Table A2. Gendered Work Outcomes and Time Use

| Outcomes | | US (benchmark) | Germany |
|---|---|---|---|
| Gender wage gap [a] | | 18.2 | 16.2 |
| Employment rate [b] | Women | 65.5 | 72 |
| | Men | 76.1 | 79.7 |
| Part-time employment rate [c] | Women | NA | 36.6 |
| | Men | NA | 9.3 |
| Hours worked (hours per worker) [d] | | 1780 | 1356 |
| Men's time allocated to main activities [e] (unit: minutes per day) | Paid work or study | 337 | 290 |
| | Unpaid work | 146 | 150 |
| | Personal care | 635 | 638 |
| | Leisure | 305 | 346 |
| | Unspecified | 17 | 16 |
| Women's time allocated to main activities (unit: minutes per day) | Paid work or study | 243 | 205 |
| | Unpaid work | 244 | 242 |
| | Personal care | 661 | 659 |
| | Leisure | 269 | 316 |
| | Unspecified | 23 | 18 |

Source: OECD (2019). (a) The gender wage gap is defined as the difference between the median earnings of men and women relative to the median earnings of men. Data refer to full-time employees. (b) The employment rate is calculated as the ratio of the employed to the working age population. (c) The part-time employment rate is the proportion of persons employed part-time among all employed persons. Part-time employment is defined as people in employment (whether employees or self-employed) who usually work less than 30 hours per week in their main job. (d) Average annual hours worked is defined as the total number of hours actually worked per year divided by the average number of people in employment per year. Actual hours worked include regular work hours of full-time, part-time and part-year workers, paid and unpaid overtime, and hours worked in additional jobs. (e) Time spent in paid work or learning activities includes: paid work (all jobs); job search; attendance of classes at all levels of instruction (pre-primary, primary, secondary, technical and vocational, higher education, extra or make up classes); research/homework; travel to and from work/study; other paid work or study-related activities. Time spent in unpaid work includes: routine housework; shopping; care for household members; child care; adult care; care for non-household members; volunteering; travel related to household activities; other unpaid activities. Time spent in personal care includes: activities required by the individual in relation to biological needs (sleeping, eating, resting etc.); performing own personal or household health-care and maintenance or receiving this type of care; travel related to personal care activities in relation to spiritual/religious care; doing nothing, resting, relaxing; meditating, thinking, planning. Unspecified category includes time spent in spiritual and religious activities and in civic obligations; or in unspecified activities.

## Table A3. Descriptive Statistics

### Panel A. Establishment Level Variables for Adoption Analysis

| Variables | Mean | Std. Dev. |
|---|---|---|
| Flex any | 0.64 | 0.48 |
| Flextime model with working time accounts | 0.55 | 0.50 |
| Trust-based working time | 0.26 | 0.44 |
| Share of vocationally trained (0-1) | 0.62 | 0.28 |
| Share of university educated (0-1) | 0.09 | 0.16 |
| Average daily wage (euro) | 78.48 | 32.15 |
| Average tenure (year) | 7.56 | 4.36 |
| Share of women (0-1) | 0.46 | 0.29 |
| Instability rate (0-100) | 13.55 | 13.68 |
| Establishment size (1000 people) | 0.09 | 0.28 |
| Works council | 0.41 | 0.49 |
| Collective bargaining agreement | 0.58 | 0.49 |

Weighted by cross-section sampling weights.

**Panel B. Individual Level Variables for FWTA Effects Analysis**

| Variables | All | | Men | | Women | |
|---|---|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. |
| Exit | 0.15 | 0.36 | 0.14 | 0.34 | 0.17 | 0.37 |
| Flex any | 0.74 | 0.44 | 0.78 | 0.42 | 0.69 | 0.46 |
| Flextime model with working time accounts | 0.67 | 0.47 | 0.71 | 0.45 | 0.61 | 0.49 |
| Trust-based working time | 0.34 | 0.47 | 0.35 | 0.48 | 0.32 | 0.47 |
| Female | 0.44 | 0.50 | 0.00 | 0.00 | 1.00 | 0.00 |
| Age | 43.04 | 11.23 | 43.10 | 11.26 | 42.97 | 11.19 |
| Mother with young children | | | | | 0.01 | 0.11 |
| Manager | 0.22 | 0.41 | 0.25 | 0.43 | 0.18 | 0.39 |
| Full time | 0.71 | 0.45 | 0.87 | 0.33 | 0.51 | 0.50 |
| Part time | 0.17 | 0.38 | 0.04 | 0.20 | 0.34 | 0.47 |
| Marginal part-time | 0.09 | 0.29 | 0.06 | 0.24 | 0.13 | 0.34 |
| Partial retirement | 0.02 | 0.16 | 0.03 | 0.16 | 0.02 | 0.15 |
| Tenure in establishment | 8.95 | 8.17 | 9.47 | 8.55 | 8.29 | 7.60 |
| German citizenship | 0.93 | 0.25 | 0.93 | 0.26 | 0.94 | 0.23 |
| No training | 0.13 | 0.34 | 0.12 | 0.33 | 0.14 | 0.35 |
| Vocational training | 0.63 | 0.48 | 0.64 | 0.48 | 0.62 | 0.48 |
| University | 0.12 | 0.32 | 0.13 | 0.34 | 0.09 | 0.29 |
| Daily wage (euro) | 92.01 | 50.15 | 108.23 | 49.08 | 71.68 | 43.64 |
| Wage censored | 0.07 | 0.26 | 0.12 | 0.32 | 0.02 | 0.14 |
| Total number of workers in establishment | 975.57 | 3846.85 | 1242.45 | 4640.22 | 641.21 | 2482.25 |
| Works council | 0.67 | 0.47 | 0.68 | 0.47 | 0.65 | 0.48 |
| Collective bargaining arrangements | 0.72 | 0.45 | 0.73 | 0.45 | 0.72 | 0.45 |
| Organization restructure | 0.06 | 0.23 | 0.06 | 0.23 | 0.06 | 0.23 |

Weighted by cross-section sampling weights.

## Table A4. Differences between FWTA Adopters and Non-Adopters

| Variables | Flextime model with working time accounts | | Trust-based working time arrangements | |
|---|---|---|---|---|
| | Ever adopters | Non-adopters | Ever adopters | Non-adopters |
| Share of vocationally trained (0-1) | 0.62 | 0.55 | 0.63 | 0.63 |
| | (0.28) | (0.31) | (0.27) | (0.28) |
| Share of University-educated (0-1) | 0.08 | 0.08 | 0.09 | 0.06 |
| | (0.16) | (0.16) | (0.17) | (0.13) |
| Average daily wage (euro) | 73.48 | 69.26 | 81.82 | 74.19 |
| | (29.59) | (32.75) | (32.81) | (30.39) |
| Average tenure (year) | 7.05 | 6.42 | 7.61 | 7.34 |
| | (3.97) | (4.01) | (4.29) | (4.39) |
| Share of women (0-1) | 0.49 | 0.51 | 0.46 | 0.46 |
| | (0.30) | (0.29) | (0.29) | (0.29) |
| Instability rate (0-100) | 15.95 | 14.37 | 15.34 | 13.15 |
| | (13.06) | (15.26) | (12.86) | (14.45) |
| Establishment size (1000 people) | 0.07 | 0.06 | 0.09 | 0.08 |
| | (0.14) | (0.12) | (0.30) | (0.18) |
| Works council | 0.33 | 0.24 | 0.43 | 0.39 |
| | (0.47) | (0.43) | (0.50) | (0.49) |
| Collective bargaining agreement | 0.58 | 0.48 | 0.62 | 0.59 |
| | (0.49) | (0.50) | (0.48) | (0.49) |
| N | 3621 | 7230 | 7189 | 20373 |

Standard deviation in parentheses. Pre-adoption data weighted by cross-section sampling weights. Ever adopters are establishments that adopted flexible working time arrangements during the study period. Non-adopters are establishments that had not adopt flexible working time arrangements by the end of the study period.

## Essay 3: Certified for Success? Self-Regulation of Corporate Responsibility and Market Response in China[18]

### Introduction

Self-regulation is a common response to stakeholder pressure about social and environmental issues. In recent decades, activism has led many firms and industries to adopt codes of conduct, certification mechanisms, or other modes of self-regulation (Elliott and Freeman 2003, King and Soule 2007, Seidman 2007, Bartley 2007, Short and Toffel 2010, Yue et al. 2013). For example, the supermarket chain Whole Foods responded to a Greenpeace-led campaign against the use of genetically modified grains by announcing a voluntary commitment to label all products containing genetically modified organisms (Soule 2009). Organizations like the Fair Labor Association and the Responsible Business Alliance (formerly the EICC) have emerged to coordinate self-regulation of labor and environmental issues in the supply chains of major electronics, apparel, and footwear companies (Marx 2008, Locke 2013, Distelhorst et al 2015). Finally, self-regulatory certifications like the Rainforest Alliance, FairTrade, and SA8000 allow individual firms to brand their own business practices as more environmentally or socially responsible (Blowfield and Dolan 2010, Ochieng et al. 2013, Leipziger 2009).

In some cases, self-regulation is a response to the perceived failure of government regulation in institutional settings of high corruption. Particularly in emerging markets, labor and environmental regulators are weakened by corruption, inadequate resources, or both (Acemoglu and Verdier 2000, Della Porta and Vannucci 1999). Concern about the

[18] Coauthored with Greg Distelhorst (Assistant Professor, University of Toronto) and Judith Stroehle (Postdoctoral Fellow, University of Oxford).

integrity of regulatory mechanisms in emerging markets extends to the non-governmental actors that audit firms and assure compliance with self-regulatory initiatives (Montiel et al. 2012, Bartley 2010, Bartley et al. 2015). Herein lies a major tension in the self-regulation of corporate responsibility in emerging markets. Self-regulation is intended to remedy mistrust of traditional regulatory actors and assurance mechanisms, yet that same mistrust threatens the integrity of self-regulatory initiatives (Vogel 2008, Mayer and Gereffi 2010). If bribery of government inspectors and corporate auditors is widespread, it is unclear whether self-regulatory initiatives can function as intended and whether market actors will respond to self-regulation or simply ignore it.

Are firms that self-regulate in a corrupt context more socially responsible? Or do irresponsible firms use self-regulation to shield themselves from scrutiny? And how do markets respond to self-regulation in this setting? To address these questions, this study examines an international self-regulatory initiative—the SA8000 social responsibility certification—in the high-corruption context of China in the mid-2000s. We begin by establishing an empirical puzzle: on average self-regulation identifies firms with *higher* average wages, despite ample opportunity for corruption in this institutional context. Unreliable assurance mechanisms did not prevent self-regulation from offering useful information about average differences between certified and non-certified firms.

These findings are puzzling in light of previous research on what makes self-regulation effective. The research literature has repeatedly pointed to the role of a strong legal environment, surveillance, and sanctions in making private regulation effective, documenting the problem of adverse selection into self-regulation that arises in their absence (King and Lenox 2000, Lenox and Nash 2003, King et al. 2005, Short and Toffel

2010). Firms that have something to hide—such as higher levels of pollution or worse working conditions—select into self-regulation to improve their image with external audiences. Given that past research finds adverse selection even in low-corruption contexts like the United States, it is surprising not to observe similar dynamics in a country where surveillance and sanctioning around corporate responsibility are understood to be of poor quality (Harney 2008, Locke 2013, Bartley et al. 2015).

To explain this disparity between our findings in China and past research, we turn to the varying motives behind self-regulation. We theorize an excludable benefit from self-regulation that can render it less susceptible to adverse selection: the attraction of reputation-sensitive buyers. Social movements around labor abuses in global supply chains—such as the anti-sweatshop movement on university campuses (Bair and Palpacuer 2012, Bartley and Child 2014)—have made certain buyers highly sensitive to the reputational risk associated with the labor conditions in their suppliers (Bartley 2005, Vogel 2005, Locke 2013). These reputation-sensitive buyers manage risk in part by seeking commercial relationships with suppliers that adhere to minimum standards of social responsibility.

Adopting a self-regulatory standard focused on social responsibility is one way to signal lower risk to reputation-sensitive buyers. Yet if obtaining a certification was all that was required to sustain commercial relationships with these buyers, we would still expect adverse selection into these programs. Less-responsible firms could use self-regulation to improve their external image while concealing their true practices. However, reputation-sensitive customers also engage in *private monitoring* of their suppliers' practices during the commercial relationship. Thus, establishing commercial

relationships with reputation-sensitive buyers increases surveillance of a self-regulator's practices. Firms that bribe their way into certification face a risk of future detection and possible termination of the commercial relationship. Our assumption is that these less-responsible firms understand the risk of discovery, anticipate shorter-lived commercial relationships with reputation-sensitive buyers, and therefore expect lower benefits from self-regulation (which has costs even if certification is obtained through bribery). Their rational expectation of future discovery dampens adverse selection into self-regulation. By contrast, firms that already comply with social responsibility standards anticipate an ability to continue the commercial relationship despite the surveillance of reputation-sensitive buyers. They anticipate greater returns to self-regulation through the cultivation of these commercial relationships.

The theory of self-regulation in pursuit of reputation-sensitive buyers generates several hypotheses. First, it predicts that socially responsible firms select into certification; their difference from other firms will pre-date self-regulation. Second, it expects varying responses from different market actors. Because anti-sweatshop social movements almost exclusively target major brands headquartered in advanced economies (Bartley and Child 2014), reputation-sensitive buyers are almost entirely foreign (i.e. located outside China). We hypothesize these foreign buyers to be more responsive to self-regulation than domestic customers in an emerging market setting. To assess the effects of self-regulation, we estimate both traditional panel fixed effects models and difference-in-differences models that account for selection into self-regulation by analyzing subsamples balanced on pretreatment levels and trends. We consistently find that self-regulation is associated with varying responses from different market actors;

exports to international buyers increased while sales to domestic firms fell marginally. (We test and reject the null hypothesis of no difference in effects.) These two effects largely offset one another, resulting in little net change in total sales. But our findings also suggest benefits to cultivating relationships with reputation-sensitive buyers. Self-regulators are slightly more likely to survive than comparable firms that did not engage in self-regulation.

In addition to the literature on industry self-regulation, this study also addresses a debate about the mechanisms of private governance of social responsibility in global supply chains (Elliott and Freeman 2003, Locke 2013, Weil 2014, Toffel et al. 2015, Bartley 2018, Kuruvilla et al. 2020). We find no evidence that self-regulation caused the average wages of adopters to increase. SA8000 in China functioned primarily through *selection* rather than through *transformation*. Yet it still benefited the firms able to select in.

## Self-Regulation and Adverse Selection

Industry self-regulation describes voluntary institutions through which firms or their representative associations commit to observe standards beyond what is legally required. These pledges are often formalized through membership in self-regulatory associations or certification to some self-regulatory standard (Christmann and Taylor 2006, Bartley 2007, Barnett and King 2008). Claims of self-regulation have long been met with skepticism. How can we trust firms to police themselves?

A rich body of research investigates what renders self-regulatory institutions credible and effective. Studies across several fields suggest self-regulatory institutions are most effective when participating firms are subject to both surveillance and sanctions.

Improved surveillance, monitoring by some external agent, is consistently associated with improved compliance outcomes in self-regulatory arrangements (Weil 2005, Short and Toffel 2010). Surveillance can be improved by increasing its intensity and reducing moral hazard among monitors (Pierce and Toffel 2013). Similarly, increasing the threat of sanctions for firms that do not comply also improves the quality of self-regulation (Ayres and Braithwaite 1992, Lenox and Nash 2003, Short and Toffel 2008, Henriques et al. 2013), despite some risk that threats undermine organizations' intrinsic motivations to comply (Short and Toffel 2010).

In the absence of surveillance and sanctions, self-regulatory schemes have been found to suffer from adverse selection (King et al. 2005). Research on the U.S. chemical industry's voluntary Responsible Care program has shown heavier polluters selecting into the program and poorer environmental performance among members than non-members (King and Lenox 2000, Lenox and Nash 2003, Gamper-Rabindran and Finger 2013). Research on environmental self-regulation with few sanctions in Mexico also found adverse selection of firms into ISO14001 certification with no subsequent improvement in environmental performance (Blackman 2012, Blackman and Guerrero 2010). However, in settings where adopters were subject to increased surveillance and sanctions (such as ejecting noncompliant members), adverse selection is reduced (Lenox and Nash 2003) and higher levels of compliance with program standards are observed (Christmann and Taylor 2006).

Self-regulatory institutions have also been studied under the framework of certified management standards (Corbett et al. 2005, Levine and Toffel 2010, Heras-Saizarbitoria and Boiral 2013; Sartor et al. 2016). These certifications can communicate

information about firm behavior, including labor and environmental practices, to potential customers that might otherwise be concealed (King et al. 2005; Terlaak and King 2006; Berliner and Prakash 2013). Yet certified management standards also rely on surveillance and sanctions to maintain their integrity. If the payoffs to certification exceed the costs of deceiving certification bodies, certification schemes may be abused by firms that wish to deceive potential customers, leading to adverse selection (Boiral 2007; Yeung and Mok 2005; Albuquerque et al. 2007; Aravind and Christmann 2011; Montiel et al. 2012). Research on environmental certifications documents high-polluting firms selecting into certification (Potoski and Prakash 2005, Blackman and Guerrero 2010) and wide variation in the implementation of environmental management practices (Aravind and Christmann 2011, Testa et al. 2018), with some arguing that certification is largely "ceremonial" rather than substantive (Boiral 2007). Aligned with the literature on self-regulation, previous research on certified management standards also foresees adverse selection when surveillance of adopting firms is poor and the institutions awarding certifications are corruptible.

## The Puzzle of SA8000 in China

Our study begins with a puzzling finding in a setting where previous research suggests self-regulatory institutions should attract poor performers: mainland China in the 2000s. In the preceding two decades, China had experienced explosive economic growth, surging exports, and massive foreign direct investment. At the same time, China was among the most corrupt countries in the world (Svensson 2005), with evidence that firms grew and profited in part from corrupt transactions with officials (Wang and You 2012,

Jiang and Nie 2014). Laws governing property rights, contracts, and competition were only weakly enforced (Clarke et al. 2008, Xu 2011).

In this setting, we study a self-regulatory institution focused on employment practices and wages: the SA8000 social certification. Social Accountability International, a U.S. non-profit organization, established this management system standard in 1997 to promote "social accountability in workplaces."[19] The standard is organized around labor provisions within the Universal Declaration of Human Rights and International Labor Organization (ILO) conventions. SA8000 also mandates that workers in certified employers earn a "living wage" that may be higher than legal minimums or industry standards.

Social Accountability International delegates the authority to issue SA8000 certifications to independently-managed local certification bodies.[20] These organizations train applicant firms and evaluate whether their practices meet the standards required for certification. In mid-2000s China, authorized certification bodies included international auditing firms with revenues in the billions such as Bureau Veritas, SGS, and Intertek. Each was accused of corruption or ineptitude in its social auditing practices in China's high-corruption context. Bureau Veritas, the biggest certifier of SA8000 in China over 1998-2009, was accused of soliciting bribes from noncompliant factories in south China in exchange for helping them pass social responsibility audits (China Labor Watch

[19] Social Accountability International, "SA8000 Standard." https://goo.gl/jYri2K (Accessed March 19, 2018).
[20] A list of currently accredited certification bodies is available here: http://www.saasaccreditation.org/accredcertbodies

2009).[21] Intertek was similarly accused of soliciting and accepting bribes to help factories in China pass social audits.[22] SGS factory inspections in China were characterized by *The New York Times* as "fast and flawed."[23]

These issues among the audit firms certifying SA8000 in China mirror a widely documented phenomenon of fraud and deception in audits of labor practices in China. Factories in China have often sought to pass inspections from their foreign buyers by maintaining double-books or coaching workers to give deceptive responses to auditors (Harney 2008; Locke 2013). This produced an industry of "audit consultants" in China who help firms to falsify records and deceive labor auditors (Kuruvilla and Li forthcoming). Social auditing in China has been likened to a game in which auditors try to obtain, "the elusive real data while factory managers offer suspicious or partial records and workers parrot answers that auditors suspect are coached" (Bartley et al. 2015, p.163).

In light of the possibilities for auditor corruption and factory deception in this self-regulatory regime, previous literature leads us to expect adverse selection into self-regulation. Firms face surveillance of uncertain quality and few consequences for engaging in fraud. We might therefore expect low-wage firms to select into a social responsibility certification, hoping to reap the benefits of a "socially responsible" brand while paying none of the costs associated with higher working standards or higher wages.

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[21] "Refuse “Bribery Demands” and Fail Tests: Factory Names International Certification Company in Complaint of Unethical Audit Behavior, Still No Response from Company" *Southern Metropolis Daily*. August 5, 2009.
[22] "China Labor Watch’s Announcement as to its Lawsuit Against Intertek Group PLC." http://www.chinalaborwatch.org/newscast/157
[23] "Fast and Flawed Inspections of Factories Abroad." *The New York Times*. September 1, 2013. https://www.nytimes.com/2013/09/02/business/global/superficial-visits-and-trickery-undermine-foreign-factory-inspections.html

SA8000 mandates that certified firms pay wages sufficient to meet their employees' basic needs. To seek evidence of adverse selection into self-regulation, we therefore compared wages among firms holding SA8000 certification in 2008 to firms without in a representative sample of industrial enterprises in China. (Our data are described in detail in the main empirical section of this study.) Surprisingly, we found no evidence of adverse selection. SA8000 certification was associated with *higher* average wages within industries and regions. Across various specifications reported in Appendix Table 1, firms holding SA8000 certification in 2008 exhibited 11% ($e^{0.103}$) to 14% ($e^{0.134}$) higher wages than comparable non-certified firms. The wage advantage of SA8000 adopters was evident across the wage distribution. Average wage gaps between adopters and non-adopters at the 25$^{th}$, 50$^{th}$, and 75$^{th}$ percentiles were +12%, +6%, and +10% respectively.

This puzzling observation—a self-regulatory institution in a setting of weak surveillance and sanctions with no evidence of adverse selection—motivates our theory development in the following section. It also raises questions about *how* SA8000-adopters in China ended up with higher wages, a question addressed by the empirical analysis that follows.

## Theory: Self-Regulation in Pursuit of Reputation-Sensitive Buyers

Firms have diverse goals for engaging in self-regulation. One influential body of research examines self-regulation as defensive action to mitigate various threats. Firms may engage in self-regulation to forestall government regulation, seeking to improve the image of an industry in the eyes of regulators (Lenox and Nash 2003, Lenox 2006, Héritier and Eckert 2008, Baron 2014). The benefits of such self-regulation can accrue to

both participants in the institution and non-participants in the same industry that share a common reputation (King et al. 2002, Barnett and King 2008). Alternatively, self-regulation can also be a response to threats from activist campaigns and broader social movements (Bartley 2005, King and Soule 2007, Eesley and Lenox 2006, Reid and Toffel 2009, Harrison and Scorse 2010, Baron 2014, McDonnell et al. 2015).

An alternative approach to self-regulation focuses not on responding to threats but rather on gaining strategic advantage. Voluntary commitments around social or environmental responsibility can also serve to differentiate the offerings of the firms that adopt them (Vogel 2005, Baron 2009). These theories focus on benefits that accrue to firms that adopt self-regulation. Many self-regulatory initiatives have "brands" that may confer reputational benefits only to adopters, sometimes conceptualized as club goods (Potoski and Prakash 2005; Barnett and King 2008,). These reputational benefits may allow firms to overcome negative reputations associated with their locations (Berliner and Prakash 2013), differentiate their offerings (Boehe and Cruz 2010, Chen and Lee 2017) or attract high-quality employees at lower costs (Burbano 2016).

We propose that one such excludable benefit from self-regulation of social responsibility is *attracting reputation-sensitive buyers*. We use "buyers" to clarify that these actors are also firms with their own set of organizational interests, rather than individual consumers making purchase decisions in a retail setting. Many firms primarily provide offerings to other firms rather than directly to consumers, an arrangement that has grown with the spread of global value chains in the globalization of the 1990s and 2000s (OECD 2013).

Buyers vary in their sensitivity to the social responsibility of their supplier firms. Well-known consumer brands like Nike, HP, and Coca-Cola have elaborate management systems to monitor the social and environmental practices of their supplier firms (Locke 2013). Other buyers have taken few measures to monitor social and environmental issues in their supply chains. In a global survey of publicly listed companies in food, textiles, and wood products, roughly 40% had adopted a code of conduct specifying social or environmental standards for their supplier factories (Thorlakson et al. 2018)—a majority had not done so.

We posit that firms in emerging markets may self-regulate with the SA8000 standard in order to attract this subset of reputation-sensitive buyers. Recent evidence shows that these buyers make purchasing decisions in part based on the social compliance of supplier firms. Reputation-sensitive buyers are more likely to decrease business or terminate commercial relationships with firms engaged in socially irresponsible activities (Oka 2012, Distelhorst and Locke 2018, Amengual et al. 2019). Managers of factories in emerging markets are aware of this requirement and report a willingness to invest in improved working conditions in order to attract these foreign buyers (Malesky and Mosley 2018).

Self-regulation to attract reputation-sensitive buyers differs from defensive self-regulation to forestall government regulation or mollify activist threats. The key to our model is that reputation-sensitive buyers engage in private surveillance of social responsibility in their supply chains. When firms increase their business with reputation-sensitive buyers, they increase the probability that socially irresponsible practices will be discovered by an external stakeholder. Thus, rather than seeking to reduce scrutiny from

regulators or activists, self-regulation in pursuit of these buyers leads to *increased surveillance of the self-regulator*. Because these buyers also adjust commercial relationships based on social responsibility of their suppliers, successfully attracting these buyers also leads to increased probability of sanctions for violating the self-regulatory standard.

We theorize that this post-certification increase in private surveillance and sanctions from buyers can offset poor integrity of the processes that lead to certification. Firms considering whether to obtain a social responsibility certification anticipate these dynamics and form rational expectations of the returns to self-regulation. Firms that are truly compliant to the standard expect greater benefits from self-regulation. Their compliance makes them resilient to the possibility of increased surveillance and sanctions from their (future) buyers. By contrast, firms whose practices deviate from the standard face higher expected costs of continued efforts to deceive the private surveillance of reputation-sensitive buyers to avoid detection. They therefore anticipate lower benefits and are less likely to adopt self-regulation.

<Insert Figure 1 about here>

In this way, self-regulation to attract reputation-sensitive buyers differs from self-regulation to reduce government regulatory pressures (as in, for example, the chemical industry's Responsible Care program) or defuse activist challenges. When self-regulation seeks to reduce scrutiny from external stakeholders, firms already experience or anticipate high surveillance and sanctions for their behavior. Their goal is to reduce future surveillance by signaling their voluntary willingness to abide by supposedly stringent private standards. However, when pursuing reputation-sensitive buyers, self-

regulation leads to increased (private) surveillance and sanctions. This distinguishes self-regulation to attract reputation-sensitive buyers from the dynamics in other self-regulatory settings, where adverse selection has been repeatedly observed (King and Lenox 2000, Lenox and Nash 2003, Blackman and Guerrero 2010, Blackman 2012, Gamper-Rabindran and Finger 2013).

This buyer-seeking model generates hypotheses about both selection into self-regulation and the consequences of self-regulation even in low surveillance, low sanctions settings. Our first hypothesis is that the puzzling result reported above—higher wages among SA8000-adopters in China—reflects high-wage firms *selecting into* certification, rather than a causal effect of self-regulation. If adopters are the firms that can withstand increased scrutiny of their labor practices from new reputation-sensitive buyers, they should already observe high standards at the time of self-regulatory adoption. The wage advantage of SA8000 adopters should therefore pre-date their adoption of the self-regulatory standard.

> **H1. Selection into self-regulation.** The wage advantage among self-regulators will pre-date adoption of self-regulation.

This hypothesis focuses on wage levels, rather than non-wage working conditions that also characterize socially responsible employers, for three reasons. First, low wages are a major focus of anti-sweatshop campaigns targeting multinational corporations (Elliott and Freeman 2003, Harrison and Scorse 2010), and therefore generate risk for reputation-sensitive buyers. Second, surveys of workers in China and other emerging markets find that wages are a key determinant of both employment decisions and job satisfaction (Gao and Smyth 2010, Linz and Semykina 2012, Franceschini et al. 2016,

Chung 2015). Wages and benefits are also among the most important drivers of labor disputes in China (Wang and Cooke 2017; Xie et al. 2017). According to China Labor Bulletin's Strike Map, about 80 percent of all collective protests are motivated in part by unpaid wages.[24] Finally, the SA8000 standard is one of the few that mandates wages higher than legal minimums. Wages should, "be sufficient to meet basic needs of personnel and to provide some discretionary income" (Social Accountability International 2001).

Our model of buyer-seeking self-regulation also predicts that different market actors will respond differently to this form of self-regulation. Buyers that are sensitive to the reputational threats of low wages in their suppliers will find self-regulation of social responsibility attractive—the self-regulator's business with reputation-sensitive buyers should increase. On the other hand, there are many buyers who are less concerned with labor issues in their supply chains. We expect these buyers to be indifferent to self-regulation. It is even possible that self-regulators will substitute sales away from these buyers and toward reputation-sensitive buyers.

We are unable to observe buyer-by-buyer transactions in our data on Chinese firms, which prevents us from calculating sales to buyers based on a direct measure of their reputation sensitivity. However, we know that social movements focused on labor in global supply chains have predominantly targeted retailers and brands headquartered in the advanced economies of North America and Europe (Rodríguez-Garavito 2005, Harrison and Scorse 2010, Bartley and Child 2014). In contrast, China's domestic

[24] China Labour Bulletin. "Employment and Wages." July 15, 2019. URL: https://clb.org.hk/content/employment-and-wages

retailers and brands were not subject to the same level of scrutiny in the mid-2000s. Reputation-sensitive buyers should therefore be almost entirely overseas buyers, and we hypothesize that buyer-seeking self-regulation will have heterogeneous effects on international sales and domestic sales:

> **H2. Effect on exports.** Self-regulation of social responsibility will lead to increased exports.
>
> **H3. Effect on domestic sales.** Self-regulation of social responsibility will have no effect on domestic sales.

As our hypotheses deal with both selection into self-regulation and its subsequent effects, we analyze longitudinal data and use several different estimation strategies, described below.

## Data and Empirical Strategy

### Data

A major challenge to studying self-regulation in the developing world is the lack of data on emerging market firms. Previous research includes impressive original surveys that compare firms with and without SA8000 certification (Bartley and Zhang 2017, Bartley 2018), but non-random sampling makes it difficult to draw conclusions beyond the sample itself. Our study therefore uses the annual survey of industrial enterprises conducted by China's National Bureau of Statistics over an eleven-year period from 1998 to 2008. China's official industrial survey data have been used to study tariff reductions (Fieler and Harrison 2019), decentralization of state-owned enterprises (Huang et al. 2017), WTO membership (Brandt et al. 2019), foreign investment spillovers (Du et al.

2012), and domestic value added in exports (Kee and Tang 2016). This industrial survey incorporates every non-state-owned firm with at least 5 million yuan in annual sales as well as all state-owned firms.[25]

We then obtained records from Social Accountability International (SAI) containing the names and certification dates of every SA8000-certified enterprise in mainland China during this period. We used a variety of sources to match SAI's English-language records to the Chinese-language industrial data. To authenticate our matches, we verified that the English-language firm addresses matched the firm addresses appearing in the industrial data. In total, this process identified 197 certified firms appearing in the industrial survey over the 1998-2008 period, out of a total 424 certified firms in SAI's records. Possible causes of non-matches may include size (i.e. some certified firms did not meet the minimum sales standard for inclusion in the China industrial census), vague translations of firm names into English, and incomplete firm addresses that prevented matching. SA8000 has expanded since our study period in the mid-2000s, but social responsibility certifications in China remain quite rare compared to self-regulation of environmental management practices. As of early 2020, just 606 firms were SA8000 certified in mainland China.[26] By contrast over 135,000 facilities in China had ISO14001 environmental management certificates as of late 2018.[27]

Table 1 defines our outcome measures. Following Du, Harrison, and Jefferson (2012), we deflate domestic and export sales by 29 sector-specific price indices for

[25] Due to this threshold, China's annual industrial survey is not a complete industrial census. It is only informative of firms above the minimum size.
[26] Social Accountability International. SA8000 Certified Organizations, Pie Chart, by Country. URL: http://www.saasaccreditation.org/SA8000_Certified_Organisations_Pie_Chart_by_Country (Accessed March 29, 2020)
[27] ISO Survey 2018. URL: https://www.iso.org/the-iso-survey.html (Accessed March 29, 2020.)

industrial products in China.[28] To adjust wages for local inflation, we deflate wages and benefits by annual provincial consumer price indices.[29] Those variables are scaled to a value of 100% in 1998. All raw measures are winsorized at the 99th percentile to reduce the impact of outliers. Finally, we define a proxy indicator for "living wage" compliance for each factory each year. Computing local living wages is complex, and work on this topic has largely come after the period of our research in China. We therefore use a second-best metric by computing whether the establishment's average wage is at least 25% above the local legal minimum wage.[30] Trade union presence is only irregularly available in the industrial data and therefore could not be used in our panel analyses. Table 2 reports summary statistics of the panel.

<Insert Table 1 about here>

<Insert Table 2 about here>

**Modeling Selective Adoption of SA8000**

To study selection into SA8000 certification, we compare the features of adopters and non-adopters prior to certification. In any certified facility, all years from the first year of SA8000 certification onward are excluded from the analysis, even if the factory later allowed certification to lapse. For 38 of the 197 matched firms, pre-certification

[28] Sector specific ex-factory price indices for industrial product appear in China Urban Life and Price Yearbooks and China Statistical Yearbooks.
[29] Consumer price indices for each province appear in Chinese Statistical Yearbooks.
[30] A 2015 study (long after our study period) estimated that a local living wage in southern China would be 39% above the local minimum wage. We have re-run our analyses using the 39% standard and get the same results. URL: https://www.globallivingwage.org/wp-content/uploads/2018/05/Urban_Shenzhen_Living_Wage_Benchmark_Report1.pdf

information is absent. In total, we observe 695 pre-certification factory-years across 159 firms that obtain certification.

In our estimation of pre-certification differences between adopters and non-adopters, we account for several confounders. Adopters are more concentrated in certain industries and geographic regions than in others (see Figure 2). Adopters may also be less likely to be state-invested firms that have a more domestic orientation. Finally, adoptions of SA8000 occur at different points in time during a period of rapid economic growth in China, and the distribution of factory-years among seeking firms may differ from that of non-seekers. Raw differences between adopters and non-adopters may reflect these many confounding influences in addition to differences based on the decision to seek SA8000 certification.

<Insert Figure 2 about Here>

To control for these confounding factors, we fit models with fixed effects for increasingly narrowly defined factory groups. Our initial comparison estimates differences within (prefecture[31] × two-digit industry × year) groupings. We then narrow groupings to four-digit industry classifications. The most restrictive fixed-effects estimation adds indicators of Hong Kong / Taiwan / Macau ownership, foreign ownership. The most restrictive model is thus written as:

(1) $Y_{it} = \text{certification-adopter}_i + \theta_{jklt} + \varepsilon_{it}$

$Y_{it}$ outcomes (natural-logged in most cases) for firm *i* in year *t*, including

[31] China is divided into 334 prefecture-level jurisdictions, the level just below the province.

| | |
|---|---|
| | domestic sales, exports, employment, wage and benefit per worker, and living wage compliance |
| certification-adopter$_i$ (0, 1) | indicator that firm *i will obtain* SA8000 certification in future |
| $\theta_{jklt}$ | region *j* × industry *k* × ownership *l* × year *t* fixed effect |
| $\varepsilon_{it}$ | error term clustered by firm |

The estimated coefficient on 'certification-adopter' shows whether firms that obtained SA8000 certification exhibited different outcomes than their non-adopter counterparts in the same-region, -industry, -ownership, and -year *prior to certification*. We fit these models for a variety of outcomes to present a relatively complete picture of selection into SA8000.

**Modeling the Effects of SA8000**

To estimate post-certification effects, we use both traditional panel analysis and two-period difference-in-differences models. Both methods rely on an assumption of parallel trends in potential outcomes among treated and control units. Traditional panel analysis estimates these effects using fixed effects for units and time periods. We first fit these familiar models. However, recent econometric work highlights that two-way fixed effects models only recover the average treatment effect on the treated under restrictive conditions (Goodman-Bacon 2018, Abraham and Sun 2018, Imai and Kim 2020). Adding leads and lags of treatment, as commonly done in event studies, also leads to improper weighting in the presence of heterogeneous treatment effects (Abraham and Sun 2018).

In light of these concerns about two-way fixed effects models, we conduct a second analysis using a two-period difference-in-differences setup analyzing firms that

obtained SA8000 certification between 2005 and 2007. We then examine outcomes of all firms, adopters and non-adopters, in the years 2004 and 2008. This produces a straightforward parallel trends assumption for causal interpretation of the results: between 2004 and 2008, the difference in potential outcomes for the treatment group (adopters) is identical to the difference in the control group (non-adopters). This model to estimate the effects of certification therefore reads:

(2) $Y_{it} = certified_{it} + \gamma_i + \delta_t + \varepsilon_{it}$

| | |
|---|---|
| $Y_{it}$ | outcome for firm *i* in year *t* (2004 or 2008) including domestic sales, export sales, export share of sales, employment, wage and benefit per worker, or living wage compliance. |
| $certified_{it}$ | firm *i* is SA8000-certified between 2005-2007 (only takes value 1 when *t*=2008.) |
| $\gamma_i$ | firm fixed effect |
| $\delta_t$ | year fixed effect |
| $\varepsilon_{it}$ | error term clustered by factory |

In the presence of selection into SA8000, it is very unlikely that the control group of non-adopters exhibits parallel trends in potential outcomes to the adopters. We therefore generate subsamples of adopters and non-adopters with equal pretreatment outcome means and trends. Specifically, we use Hainmueller's (2012) entropy balancing method to re-weight our large pool of control observations. Our starting sample includes firms that obtained certification between 2005-2007 (our treatment group) and firms that never obtain certification in the same set of two-digit industries. We retain only firms appearing in the data in 2003, 2004, and 2008. This treatment group contains 55 SA8000-

adopters, and the control pool has 70,135 non-adopters. To generate an estimation sample in which treatment and control units are balanced on pretreatment levels and trends, we entropy balance on outcomes in 2003 and 2004. After re-weighting the control group, the effective sample size is just 110 firms: 55 treated and 55 control units.

Figure 3 visualizes pre- and post-balancing means and confidence intervals for our outcome measures prior to treatment (2003 and 2004). As expected, both levls and trends diverge in the unadjusted sample. Treated firms exhibited lower domestic sales and greater exports prior to SA8000 adoption. They also employed more people and paid higher average wages and benefits. After reweighting using entropy balancing, the mean and confidence interval of pre-treatment outcomes are approximately equal between the treatment and (reweighted) control groups.

<Insert Figure 3 about Here>

Finally, we investigate self-regulation and rates of firm survival. Because only state-owned firms and non-state firms with annual sales above 5 million RMB are eligible for entering the census, we use the firms' appearance in the industrial data as a proxy for their survival. We compare the probability of survival in 2008 of firms that adopt certification between 2005 and 2007 to firms that do not, conditional on firms' survival at 2007.[32] A total of 85 firms appearing in 2004 were certified between 2005-2007. To improve the plausibility of the parallel trends assumption across adopters and non-adopters, we again entropy balance on pre-treatment (i.e. in 2003 and 2004) firm performance covariates that are likely to affect firms' rate of survival including domestic

[32] This condition is important. Since we include all SA8000 firms certified between 2005 and 2007, we are partially selecting on their survival until at least 2007. By including only firms that survive to 2007, we estimate a "fair" one-year survival rate among both adopters and non-adopters.

sales, export sales, and employment. Similar to previous analysis, we include only untreated firms in the same industry and year as treated firms. The balancing process reduces the number of treated firms from 85 to 59. The model of firm survival reads:

(3) $Y_i = certified_i + \varepsilon_i$

| | |
|---|---|
| $Y_i$ | firm *i*, present in 2004 and 2007, also remains in the survey in 2008 (0, 1) |
| $certified_i$ | firm *i* is SA8000-certified between 2005 and 2007 |
| $\varepsilon_i$ | error term |

## Results

### Selection into Self-Regulation of Social Responsibility

Table 3 reports the results of 42 fixed-effects models of *pre-adoption* differences between SA8000-adopters and non-adopters, presenting increasingly more restrictive specifications for six dependent variables. The left-hand panels show estimations containing only control firms in the same industry and prefecture as the self-regulation adopters. The right-hand panels show estimates from a smaller control group in the same industry and county (a smaller administrative jurisdiction). Columns (1) and (4) model fixed effects for each unique combination of region, year, and 2-digit industry. Columns (2) and (5) are similar but use the more precise 4-digit industry indicator from China's industrial survey. Columns (3) and (6) further control for firms' ownership.

<Insert Table 3 about Here>

Consistent with H1, we find that SA8000-adopters pay higher average wages before engaging in self-regulation. Adopters pay 10% ($e^{0.097}$-1, row E, column 6) higher

average wages than comparable non-adopters. Adopters' probability of having an average wage at least 25% above the local minimum wage is 4 to 5 percentage points higher than non-adopters. The pre-treatment wage advantage of self-regulators of social responsibility comes with a broader set of distinguishing features. These firms also employ more people, export more, and export a greater share of their sales. However, we detect no difference in domestic sales across the two groups.

**Effects of Self-Regulation of Social Responsibility**

Table 4 Panel A reports the results of two-way panel fixed effects models without balancing. Consistent with H2, self-regulation of social responsibility has a large positive effect on exports and export share of sales. Adopting SA8000 certification is associated with 95% ($e^{0.667}$ - 1) higher export sales and 20% ($e^{0.186}$ - 1) higher export share of sales. Consistent with H3, we find no evidence that SA8000 was associated with increases in domestic sales. The coefficient is negatively signed, and we cannot reject the null hypothesis that it is zero. Comparing the coefficients on domestic sales and export sales in Panel A, the difference in effect magnitudes is 0.89 with an estimated standard error of $\text{sqrt}(0.24^2 + 0.20^2) = 0.31$.

Panel B displays results from our two-period difference-in-differences model in subsamples balanced on pre-certification levels and trends of the dependent variables (Figure 3). It again shows support for H2 and H3. Self-regulation led to higher exports (126%) and export share of sales (46%). A large standard error renders the large estimated increase in total export value marginally insignificant (p=0.104), while the null hypothesis is strongly rejected for the export share of total sales. The effect on domestic sales is negative and large in magnitude but imprecisely estimated. Again we can reject

the null hypothesis of no difference between effects on domestic sales and exports; the difference in magnitudes is 1.66 with a standard error of sqrt(0.632 + 0.502) = 0.80.

Both estimation strategies indicate that self-regulation is associated with growth in employment, but no change in average wages or the probability of exceeding our living wage threshold. Self-regulation does not appear to increase the wage advantage beyond what existed prior to SA8000 certification.

<Insert Table 4 about Here>

Table 5 examines self-regulation of corporate responsibility and probability of survival in 2008, conditional on firms' survival until 2007. Column (1) shows SA8000 certification is associated with a 5.2 percentage point greater probability of survival in 2008 before adjusting for any pre-treatment covariates, but the difference is not statistically different from zero. In light of strong selection into self-regulation the effect magnitude declines to 0.8 percentage points after controlling for pretreatment (2004) exports, domestic sales, employment levels, and ownership structure. Column (3) shows results after balancing on pre-treatment domestic sales, export, employment, and ownership in both 2003 and 2004. SA8000 adoption is associated with a 1.0 percentage point increase in the probability of survival, compared to a baseline of 92% among non-adopters.

<Insert Table 5 about Here>

## Conclusions

Can industry self-regulation credibly function in corrupt contexts? If so, how? In contrast to prior research, suggesting that firms adopt self-regulation to distract from low

levels of social or environmental responsibility (King and Lenox 2000, Lenox and Nash 2003, Blackman and Guerrero 2012, Blackman 2012, Gamper-Rabindran and Finger 2013), our analysis of the SA8000 social responsibility certification in mid-2000s China finds the opposite. Adopters of the self-regulatory standard exhibit higher average wages than non-adopters. To explain this, we theorize a goal of self-regulation that is less susceptible to adverse selection: the attraction of reputation-sensitive buyers. This subset of buyers privately monitors their supplier firms, which reduces the expected returns of obtaining a social responsibility certification through bribery or fraud. Consistent with this model, we find that high-wage firms selected into self-regulation and subsequently experienced greater increases in exports than comparable controls, with no effect on their domestic sales.

This study builds on a growing body of research into certifications of social responsibility, a topic where empirical research has evolved more slowly than research into environmental management systems. Whereas recent studies explore financial performance benefits associated with certification of social responsibility (Orzes et al. 2017) and contextual factors that drive implementation (Boiral et al. 2017, De Andrade and Bizzo 2019), we focus on the implications for employee wages and economic relationships with buyers, attempting to create plausible control groups to better account for selection into SA8000 (Hiscox et al. 2009). Original surveys from China have previously illustrated some differences between SA8000 adopters and non-adopters (Bartley and Zhang 2017, Bartley 2018), but it was unclear whether those findings reflected selection into self-regulation or the effects of self-regulation. Our use of longitudinal data and empirical approach clarifies that differences in wages associated

with SA8000 are entirely the result of positive selection into self-regulation; there is no evident post-adoption effect on wages. However, self-regulation of social responsibility is associated with a dramatic increase in exports and a sizable increase in employment, along with increased probability of survival over a four-year period.

The available data impose several limitations to what this research can accomplish. First, wages can vary widely within firms, but China's official data only allows for the computation of the average employee wage. We cannot discern where in the within-firm wage distribution the self-regulator's wage advantage occurs. It is possible that it reflects differences high in that distribution, such as managerial compensation, rather than the low-wage workers that are the focus of concerns about labor in the developing world. Similarly, we cannot compare the average wage to average hours worked. If self-regulators consistently worked longer hours, their hourly compensation might not exhibit strong differences from control firms. Finally, although we can decompose sales into domestic and foreign (exports) and observe heterogeneous effects, we cannot observe the individual buyers that transact with the Chinese firms. Future research with access to firm-level transactions may be able to offer additional evidence on the composition of buyers among self-regulators.

Notwithstanding these limitations, the findings—both the lack of adverse selection and the payoffs that accrue to self-regulators—sound hopeful notes for the private regulation of social responsibility in compromised institutional contexts. We also emphasize the limited scale of self-regulation in pursuit of reputation-sensitive buyers. Our theory predicts that the scale of these self-regulatory institutions will be limited by the demand from reputation-sensitive buyers for socially responsible suppliers. Indeed,

although SA8000 has grown in China since our study period, there are currently just 606 certified firms in mainland China. This continued low demand for highly socially responsible suppliers cautions against hopes from early theorists (Fung et al. 2001) that self-regulatory institutions might help transform labor standards in entire markets.

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## Tables and Figures

### Table 1. Description of Outcome Variables

| Variable | Description |
|---|---|
| Domestic Sales | Total value of industrial products produced, or services provided by the industrial enterprise for domestic sales. It is the difference between sales and domestic sales (unit: 1000 Yuan). |
| Export sales | Total value of industrial products produced, or services provided by the industrial enterprise for export (unit: 1000 Yuan). |
| Export share of sales (%) | 100× (export sales / total sales) |
| Employment | Number of workers in the enterprise (unit: person). |
| Wages and benefits per employee | Yearly wages and benefits / Employees (unit: 1000 Yuan). |
| Living wage compliance | Dummy coded 1 if wage and benefits per employee at enterprise is at least 25% higher than the minimum wage of the county where the establishment is located. |

Note. All data (except SA8000 certifications) from the annual industrial survey of China, 1998-2008. All values deflated to 1998 constant RM

## Table 2: Descriptive Statistics for Full Sample

| Variable | Obs | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Revenue | 2,009,312 | 90,270.8 | 858,808.5 | 0.7 | 7.7e+07 |
| Domestic Sales | 1,964,578 | 74,289.4 | 772,586.7 | 0.0 | 7.5e+07 |
| Exports | 1,964,579 | 16,318.9 | 170,002.8 | 0.0 | 1.5e+07 |
| Exports share of sales (%) | 1,964,579 | 18.2 | 35.0 | 0.0 | 140.0 |
| Any exports? (%) | 1,964,579 | 28.8 | 45.3 | 0.0 | 100.0 |
| State capital (%) | 2,130,721 | 23.1 | 40.1 | 0.0 | 100.0 |
| HK/Taiwan/Macau capital (%) | 2,130,721 | 8.1 | 25.5 | 0.0 | 100.0 |
| Foreign capital (%) | 2,130,721 | 7.3 | 24.1 | 0.0 | 100.0 |
| Employees | 2,205,244 | 288.2 | 1,209.6 | 0.0 | 90,908.0 |
| Total Wages | 2,178,432 | 4,832.0 | 33,554.3 | 1.0 | 2,867,735.2 |
| Wages including bonus | 2,167,029 | 5,400.0 | 37,660.3 | 1.0 | 3,291,836.2 |
| Wage and bonus per employee | 2,165,990 | 18.0 | 100.4 | 0.0 | 97,556.0 |
| Living wage compliance (bin) | 2,144,742 | 0.86 | 0.34 | 0.0 | 1.0 |

*Notes*. 1998-2008 data (raw, not log-transformed) from China's annual industrial survey of enterprises. All currency measures in thousand RMB, deflated to 1998 values. Full sample including adopters and non-adopters of SA8000.

## Table 3. Selective Adoption of SA8000 Certification

| Specifications | Prefecture-level control group | | | County-level control group | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Dependent variables (logged): | | | | | | |
| A. Domestic Sales | -.068 (.348) | .09 (.336) | .183 (.358) | .126 (.351) | .066 (.387) | .367 (.421) |
| B. Exports | 3.725 (.327)*** | 3.402 (.296)*** | 2.371 (.289)*** | 3.278 (.317)*** | 2.855 (.304)*** | 2.054 (.318)*** |
| C. Export share of sales (%) | 1.151 (.115)*** | 1.022 (.106)*** | .635 (.106)*** | .97 (.116)*** | .825 (.114)*** | .497 (.118)*** |
| D. Employees | 1.23 (.102)*** | 1.12 (.104)*** | .944 (.102)*** | 1.145 (.099)*** | .966 (.104)*** | .859 (.115)*** |
| E. Wage + bonus per empl. | .148 (.036)*** | .139 (.033)*** | .091 (.032)*** | .127 (.037)*** | .115 (.037)*** | .097 (.041)** |
| F. Living wage compliance | .056 (.009)*** | .053 (.009)*** | .039 (.01)*** | .044 (.009)*** | .041 (.01)*** | .036 (.012)*** |
| Fixed effects specification | 2-digit industry × prefecture × year | 4-digit industry × prefecture × year | 4-digit industry × prefecture × year × HK-invested × foreign-invested | 2-digit industry × county × year | 4-digit industry × county × year | 4-digit industry × county × year × HK-invested × foreign-invested |
| Total fixed effects (from A.) | 12,903 | 101,926 | 168,024 | 29,915 | 125,413 | 174,002 |
| Observations (from A.) | 908,345 | 908,345 | 896,462 | 474,356 | 474,356 | 469,263 |

*Notes*. Results from 42 OLS fixed-effects models of differences between SA8000-adopters and non-adopters, prior to obtaining certification. Each cell reports the coefficient and standard error from separate regression estimates on a dummy variable indicating whether the firm will obtain SA8000 certification, with dependent variables (A - F) listed in the leftmost column. All DVs are natural-log transformed and winsorized at the 99$^{th}$ percentile, except for living wage compliance (binary). Columns (3) and (6) correspond to the most restrictive estimation specified in equation (1). * p < .1, ** p <.05, *** p < .01

## Table 4. Effects of SA8000 Certification

| | Domestic sales | Export sales | Export share of sales | Employment | Wage and benefit per worker | Living wage compliance |
|---|---|---|---|---|---|---|
| **Panel A. Panel Fixed Effects (all years)** | | | | | | |
| Certified | -0.218 | 0.667*** | 0.186** | 0.222*** | -0.0203 | 0.00735 |
| | (0.24) | (0.20) | (0.08) | (0.04) | (0.028) | (0.018) |
| Year fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Firm fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Constant | 8.076*** | 2.949*** | 1.292*** | 4.821*** | 2.180*** | 0.903*** |
| | (0.01) | (0.01) | (0.01) | (0.00) | (0.00) | (0.00) |
| Firm-year observations | 1,403,493 | 1,403,494 | 1,403,494 | 1,440,177 | 1,429,382 | 1,413,116 |
| Treated firms | 196 | 196 | 196 | 197 | 195 | 197 |
| Total firms | 367,437 | 367,437 | 367,437 | 384,120 | 382,870 | 376,210 |
| **Panel B. Difference-in-differences in balanced subsamples (2004 and 2008)** | | | | | | |
| Certified | -0.842 | 0.816 | 0.379** | 0.192** | 0.0248 | 0.0213 |
| | (0.63) | (0.50) | (0.19) | (0.09) | (0.05) | (0.04) |
| Year fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Firm fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Constant | 6.967*** | 10.54*** | 3.884*** | 6.886*** | 2.691*** | 0.945*** |
| | (0.16) | (0.13) | (0.05) | (0.02) | (0.01) | (0.01) |
| Firm-year observations | 212 | 212 | 212 | 220 | 216 | 220 |
| Treated firms | 53 | 53 | 53 | 55 | 54 | 55 |
| Total firms | 106 | 106 | 106 | 110 | 118 | 110 |

*Notes*. Standard errors in parentheses. All DVs are natural-log transformed, except for living wage compliance. * p < .1, ** p <.05, *** p < .01

## Table 5. SA8000 Certification and Firm Survival

| | DV: Y=1 if the firm remains in 2008 census | | |
|---|---|---|---|
| VARIABLES | OLS | OLS | Balanced subsamples |
| SA8000 certified | 0.0518 | 0.00846 | 0.0103*** |
| in 2005-2007 | (0.04) | (0.04) | (0.00221) |
| 2004 covariates: | | | |
| Domestic sales | | 0.00506*** | |
| | | (0.00) | |
| Export sales | | 0.00255*** | |
| | | (0.00) | |
| Employment | | 0.0145*** | |
| | | (0.00) | |
| State capital (%) | | -0.000591*** | |
| | | (0.00) | |
| HK/Taiwan/Macau capital (%) | | 0.000177*** | |
| | | (0.00) | |
| Foreign capital (%) | | 0.000258*** | |
| | | (0.00) | |
| Constant | 0.866*** | 0.745*** | 0.922*** |
| | (0.00) | (0.01) | (0.00156) |
| Total treated firms | 85 | 85 | 59 |
| Total firms | 116,100 | 115,857 | 118 |

*Notes*. (a) Standard errors in parentheses. All firms in this table have data in 2007. Domestic sales, export sales, and employment are winsorized at the 99$^{th}$ percentile and natural-log transformed. Rightmost column analyzes a control group reweighted using entropy balancing on each firm's 2003 and 2004 domestic sales, export sales, employment, and ownership.
* p < .1, ** p <.05, *** p < .01

**Figure 1. Attracting reputation-sensitive buyers leads to greater surveillance and sanctions**

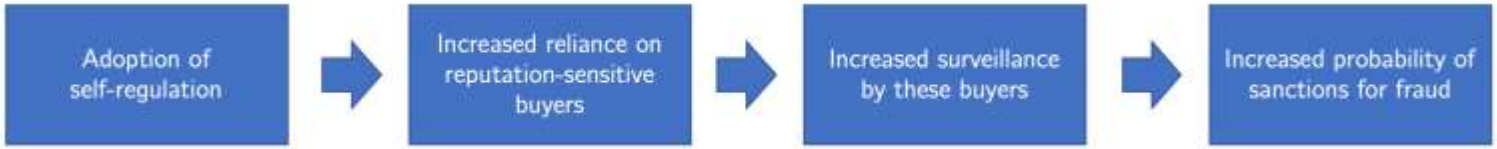
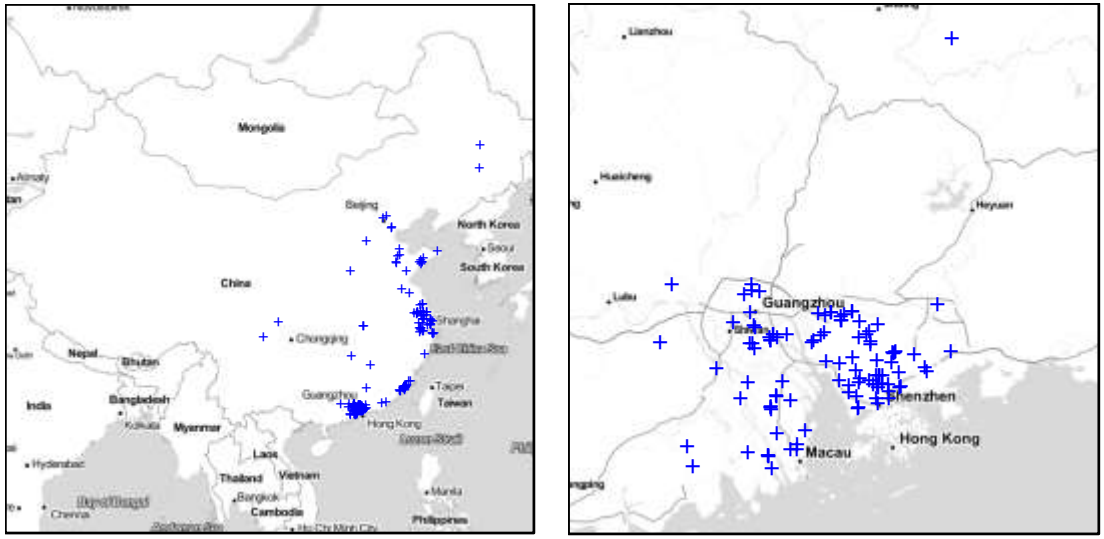
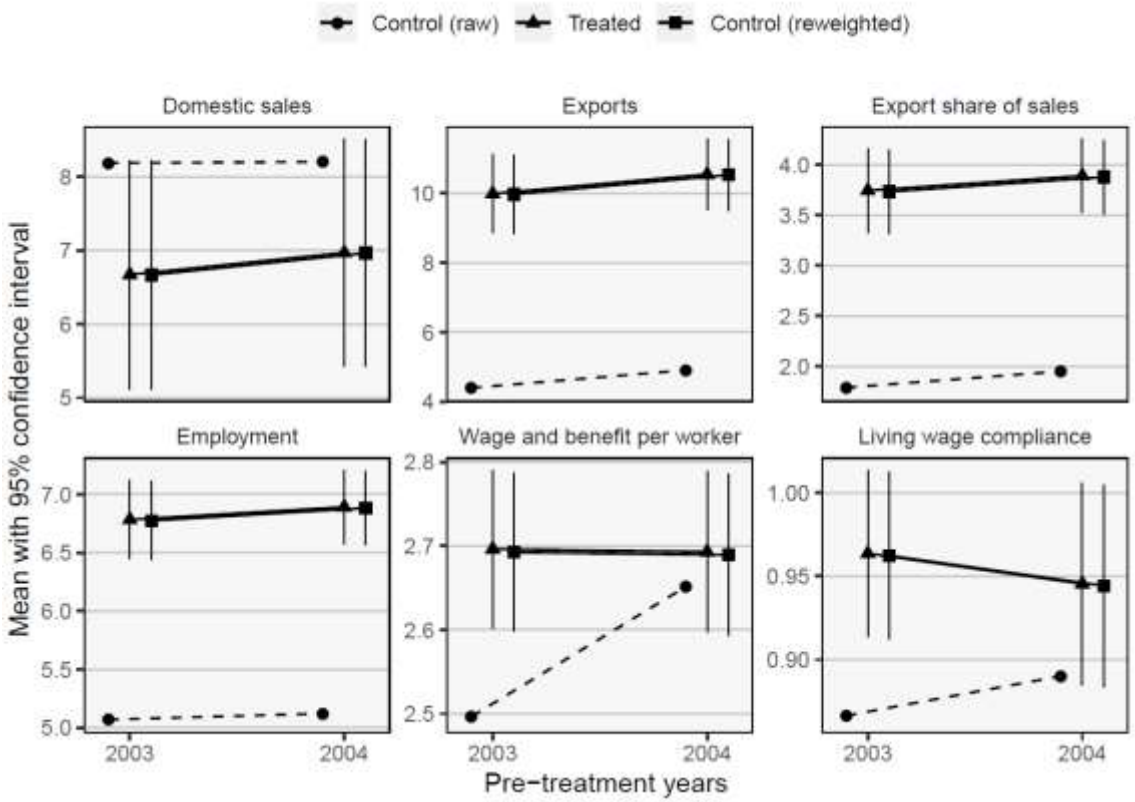



**Figure 2. SA8000 certified firms are concentrated in coastal provinces**




*Notes*. Each '+' shows an SA8000 certified firm in China with detail around Guangzhou on right.

**Figure 3: Pre-treatment outcomes before and after reweighting**




*Notes*. Shows outcome means and 95% confidence intervals among the treated and control groups prior to SA8000 certifications occurring in 2005-2007. Dotted line shows the trend in the raw control group before entropy balancing. Detailed results reported in Appendix Table 2.

# Appendix

**Table A1. Higher Average Wages in SA8000-Certified Firms in China**

| | DV: ln(wage and benefits per employee) in 2008 | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| SA8000 certified | 0.129*** | 0.107*** | 0.134*** | 0.115*** | 0.117*** | 0.103*** |
| | (0.0449) | (0.0390) | (0.0423) | (0.0374) | (0.0416) | (0.0371) |
| Fixed effects: | | | | | | |
| 4-digit industry (53) | | | ✓ | ✓ | ✓ | ✓ |
| Province (24) | | | | | ✓ | ✓ |
| Constant | 3.247*** | 3.227*** | 3.247*** | 3.227*** | 3.281*** | 3.291*** |
| | (0.00168) | (0.00156) | (0.00165) | (0.00154) | (0.262) | (0.261) |
| Observations (firms) | 83,021 | 82,109 | 83,021 | 82,109 | 83,021 | 82,109 |
| Certified firms | 124 | 121 | 124 | 121 | 124 | 121 |

*Notes*. All samples include only firms in 4-digit industries with at least one SA8000-certified firm. Models (2), (4) and (6) exclude the three highest-wage SA8000 firms, to account for the possibility that a few outliers generate this result. *** p<0.01, ** p<0.05, * p<0.1

**Table A2. Treatment and Control Groups Before and After Entropy Balancing**

| | | | Unweighted | | | | Weighted | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variable** | **Year** | **Group** | **N** | **Mean** | **SD** | **Diff. (%)** | **N** | **Mean** | **SD** | **Diff. (%)** |
| Domestic sales | 2004 | Control | 43,703 | 8.20 | 3.90 | -15.03 | 53 | 6.96 | 5.74 | 0.07 |
| | | Treat | 53 | 6.97 | 5.74 | | 53 | 6.97 | 5.74 | |
| | 2003 | Control | 43,703 | 8.19 | 3.71 | -18.52 | 53 | 6.67 | 5.78 | 0.07 |
| | | Treat | 53 | 6.67 | 5.78 | | 53 | 6.67 | 5.78 | |
| Export | 2004 | Control | 43,703 | 4.91 | 5.01 | 114.83 | 53 | 10.53 | 3.80 | 0.16 |
| | | Treat | 53 | 10.54 | 3.79 | | 53 | 10.54 | 3.79 | |
| | 2003 | Control | 43,703 | 4.40 | 4.92 | 127.21 | 53 | 9.97 | 4.23 | 0.17 |
| | | Treat | 53 | 9.99 | 4.23 | | 53 | 9.99 | 4.23 | |
| Export share sales | 2004 | Control | 43,703 | 1.95 | 2.09 | 99.64 | 53 | 3.88 | 1.36 | 0.32 |
| | | Treat | 53 | 3.89 | 1.36 | | 53 | 3.89 | 1.36 | |
| | 2003 | Control | 43,703 | 1.79 | 2.08 | 109.47 | 53 | 3.73 | 1.55 | 0.32 |
| | | Treat | 53 | 3.74 | 1.55 | | 53 | 3.74 | 1.55 | |
| Employment | 2004 | Control | 48,836 | 5.12 | 1.06 | 34.56 | 55 | 6.88 | 1.20 | 0.13 |
| | | Treat | 55 | 6.89 | 1.20 | | 55 | 6.89 | 1.20 | |
| | 2003 | Control | 48,836 | 5.07 | 1.07 | 33.81 | 55 | 6.77 | 1.27 | 0.13 |
| | | Treat | 55 | 6.78 | 1.27 | | 55 | 6.78 | 1.27 | |
| Wage and benefit per worker | 2004 | Control | 47,954 | 2.65 | 0.45 | 1.57 | 54 | 2.69 | 0.36 | 0.14 |
| | | Treat | 54 | 2.69 | 0.36 | | 54 | 2.69 | 0.36 | |
| | 2003 | Control | 47,954 | 2.50 | 0.54 | 8.00 | 54 | 2.69 | 0.35 | 0.14 |
| | | Treat | 54 | 2.70 | 0.35 | | 54 | 2.70 | 0.35 | |
| Living wage compliance | 2004 | Control | 48,380 | 0.89 | 0.31 | 6.20 | 55 | 0.94 | 0.23 | 0.12 |
| | | Treat | 55 | 0.95 | 0.23 | | 55 | 0.95 | 0.23 | |
| | 2003 | Control | 48,380 | 0.87 | 0.34 | 11.21 | 55 | 0.96 | 0.19 | 0.13 |
| | | Treat | 55 | 0.96 | 0.19 | | 55 | 0.96 | 0.19 | |

*Notes.* Visualized in main body Figure 3. Variables are in log form except living wage compliance.