Employment and Community:

Socioeconomic Cooperation and Its Breakdown*

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Abstract

Motivated by trends in US inequality and community relations, we propose a model of the interplay of employment relationships and community-based interactions among workers and managers. Employment relations can be either *tough* (where workers are monitored intensively and obtain few rents, and managers do not provide informal favors for their workers) or *soft* (where there is less monitoring, more worker rents, and more workplace favor exchange). Both workers and managers also exert effort in providing community benefits. The threat of losing access to community benefits can motivate managers to keep employment soft; conversely, the threat of losing future employment or future workers' trust can motivate workers and managers to exert effort in the community. Improvements in monitoring technologies; automation, outsourcing, and offshoring; declines in the minimum wage; and opportunities for residential segregation or for privatizing community-provided services can make both workers and managers worse-off by undermining soft employment relations and community cooperation.

Keywords: efficiency wages, employment, community, incentives, monitoring, cooperation, favor exchange, multi-activity contact, inequality.

JEL Classification: C73, D23, J00, P00

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Berbey: "In Austin [Minnesota], worker and management took each others' kids to school. They sat in the same pews at church. In other disputes, like if you were Ronald Reagan or the CEO of Chrysler or American Airlines..."

Hardy: "You didn't have to worry about going to church and having somebody spit on the back of your head."

—Journalist Gabrielle Berbey and Rayce Hardy, the son of a Hormel meatpacker, discussing the 1985 Hormel strike (*The Atlantic*, February 10, 2022).

1 Introduction

Real wages for non-college workers (and more generally for non-supervisory workers) have stagnated or even declined in the United States since 1980, while workers with post-graduate degrees and those in managerial positions have seen their earnings increase rapidly (Acemoglu and Autor 2011; Autor 2019). Simultaneously, the United States has experienced a general decline in civic participation and community-level interactions (Putnam 2000). Several other measures of the health of American communities are also in decline: for example, the fraction of out-of-wedlock births and single-parent households have increased (Kearney 2023), "deaths of despair" have risen (Case and Deaton 2020), and measures of generalized trust have fallen (Rainie and Perrin 2019).

Motivated by these trends, this paper proposes a new framework for studying the interaction of employment relations and community interactions. Following a long tradition in economic sociology (e.g., Granovetter 1973, 1985), we view employment relations as embedded in local communities. In our model, this takes the form of community interactions motivating managers to treat their workers better (as in the Hormel quote above). As in Wilson (1996), we also recognize that community interactions are influenced by the economic surplus generated by employment relations, and—more novelly—by the distribution of this surplus between workers and managers.[1] In our model, the threat of being excluded or ostracized in the community motivates both managers' and workers' contributions to the community; simultaneously, the threat of losing future employment opportunities further motivates workers, because a worker who shirks community responsibilities gets a bad reputation. The latter channel is consistent with a large literature following Granovetter (1973) that emphasizes the importance of "weak ties"—which depend on good community standing—in getting job recommendations. For example, Putnam (2000) describes how participating in civic or religious activities is critical for community standing and, via this channel, for economic success (e.g., p. 321; see also the statistical evidence in Topa 2001; Smith 2005).

1. Throughout, "managers" refers to high-level managers, business owners, and other high-pay individuals, such as lawyers, management consultants, and financiers, that have influence over the pay policy and organizational choice of firms.

Our framework makes very different predictions about the effects of several technological and institutional changes than does the standard neoclassical approach. In particular, our model can help explain the joint behavior of various employment and community-level outcomes: depressed labor market opportunities and declining relative incomes of workers (compared to managers); residential segregation; the withdrawal of managers and well-off households from community life even when they remain physically present in the neighborhood; a general decline in civic behavior and associational life in communities; and intensive monitoring and reduced favor-exchange in workplaces. These socioeconomic trends can be triggered by seemingly beneficial technological or social changes: we show, for example, that improvements in monitoring technologies; automation, offshoring, or outsourcing; declines in the minimum wage; and opportunities for residential segregation or for withdrawing from community interactions can induce a shift from more-trusting to less-trusting employment relations. Once the effects of employment relations on community cooperation are taken into account, these apparently efficiency-enhancing changes can leave both workers and managers worse off. The common thread among these changes is that they all reduce workers' *employment rents* (the surplus workers get from their jobs relative to their outside options). This in turn depresses workers'—and indirectly managers'—willingness to contribute to the community.

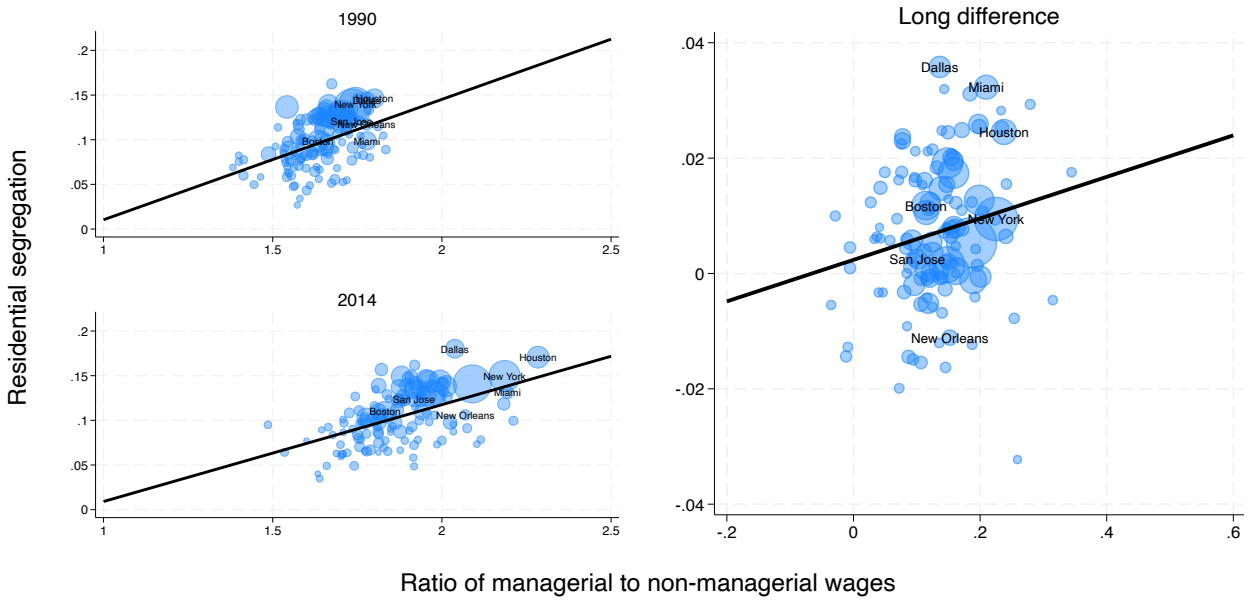
Trends in Employment and Community Relations. Before describing our model and results in greater detail, we document several motivating stylized facts on the joint changes in employment and community relations in the United States over the last several decades. In these exercises, we consider variation across US commuting zones (approximating local labor markets) between 1990 and the mid-2010s. We focus on a simple measure of labor market trends affecting workers: the relative earnings of managers to non-supervisory production workers (or simply "workers").[2]

Figure 1 shows that both in the cross section in 1990 and 2014, and in long differences between 1990 and 2014, there is a strong positive association between the relative earnings of managers to workers and residential segregation by income, measured by how segregated

2. To avoid composition effects, we use annual earnings of full-time full-year workers. We include lawyers, engineers, and physicians as managerial workers (but this has little effect on the results). Non-supervisory production workers are defined as all workers excluding managerial, supervisory, and administrative employees. The dates are chosen due to data availability, even though several of the trends we emphasize were already underway in the 1970s and 1980s.

Focusing on the earnings of non-supervisory production workers relative to managers is useful both to capture their social standing in the community and also as a proxy for their real purchasing power (since housing costs and the prices of non-tradable goods and services are closely linked to with the incomes of higher-earners; see, e.g., Card, Rothstein, and Yi, 2023; Acemoglu, Autor, and Restrepo, 2023). The patterns presented here are similar when we focus on the 90-50 wage ratio in the local labor market, and they are also broadly similar when we look at the nominal earnings of non-supervisory production workers. The Online Appendix provides these and other robustness checks as well as more information on sources, samples, and data processing. Basic information on sources is also provided in the notes to each figure.

Figure 1: Residential segregation



Notes: Residential segregation is computed as the two-group entropy index for residents in the bottom 75 percent and top 25 percent of the commuting zone household income income distribution (see Online Appendix for the formula). The horizontal axis is the log ratio of managerial workers' wages (including lawyers, engineers and physicians) to non-supervisory production workers' wages (all workers excluding managerial, supervisory and administrative employees). The sample is limited to the 127 commuting zones with more than 100 Census tracts. The bivariate regression line (unweighted and no controls) is displayed in each panel. The regression coefficients are: 0.135 (s.e. = 0.021) for 1990, 0.108 (s.e. = 0.018) for 2014, and 0.036 (s.e. = 0.018) for long differences. Data Source: IPUMS-Census, ACS and NHGIS. Additional details and robustness checks are reported in the Online Appendix.

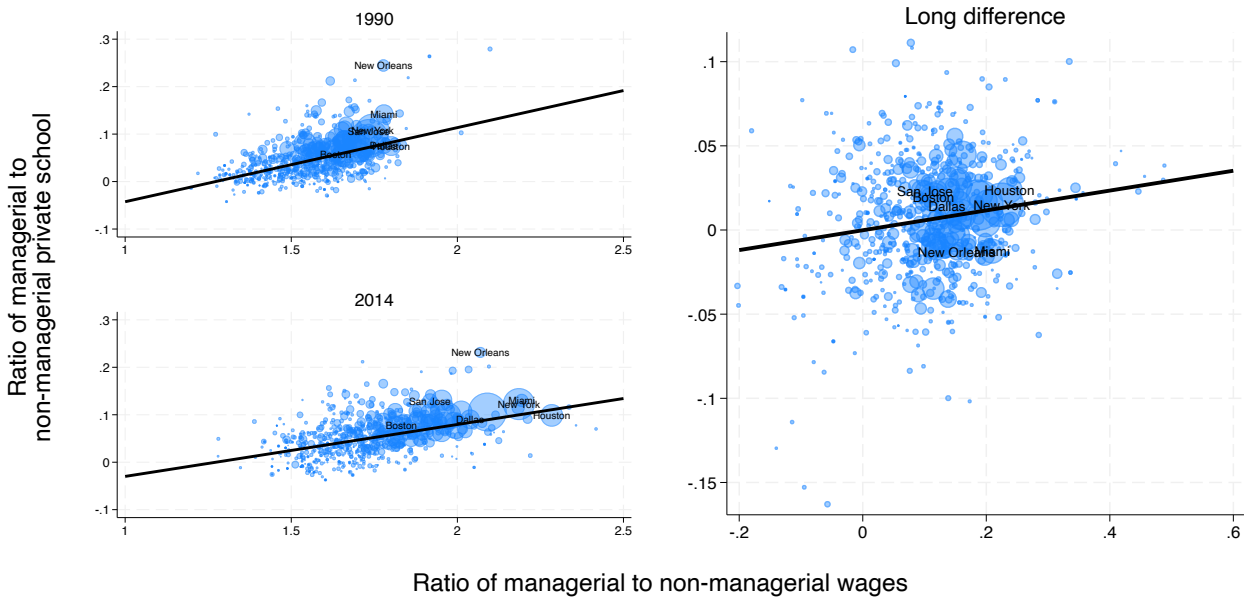
those in the top 25% of the local income distribution are from those in the bottom 75%.[3] The two panels on the left depict the bivariate cross-sectional relationship, while the right-hand side panel documents that in commuting zones where relative worker wages have declined, residential segregation has increased.[4] The Online Appendix confirms that these relationships are robust when we control for Census division dummies and differential trends by income and population across commuting zones; in specifications weighted by commuting zone population; and with alternative measures of local labor market inequality. In sum, lower relative wages for regular workers are strongly associated with greater residential segregation by income.

A possible interpretation of Figure 1 is that when the income gap between managers and

3. Residential segregation is computed as the two-group entropy index of segregation across census tracts within a commuting zone (e.g., Chetty et al., 2014). As a result, for this variable we limit our sample to the 127 commuting zones with at least 100 census tracts, for which residential segregation by income can be accurately computed. See also Fogli and Guerrieri (2019), who report a similar fact using a similarly-restricted sample of commuting zones. For the other figures, we use the full sample of 722 commuting zones, except that data availability limits our sample to 560 commuting zones for bowling alleys and to 671 commuting zones for labor complaints.

4. Across all variables we consider, long-differences estimates are smaller than cross-sectional estimates. This likely reflects the presence of fixed characteristics that are correlated both with our left-hand side variables and the ratio of managerial and non-managerial wages.

Figure 2: Ratio of managerial to non-managerial private school enrollment



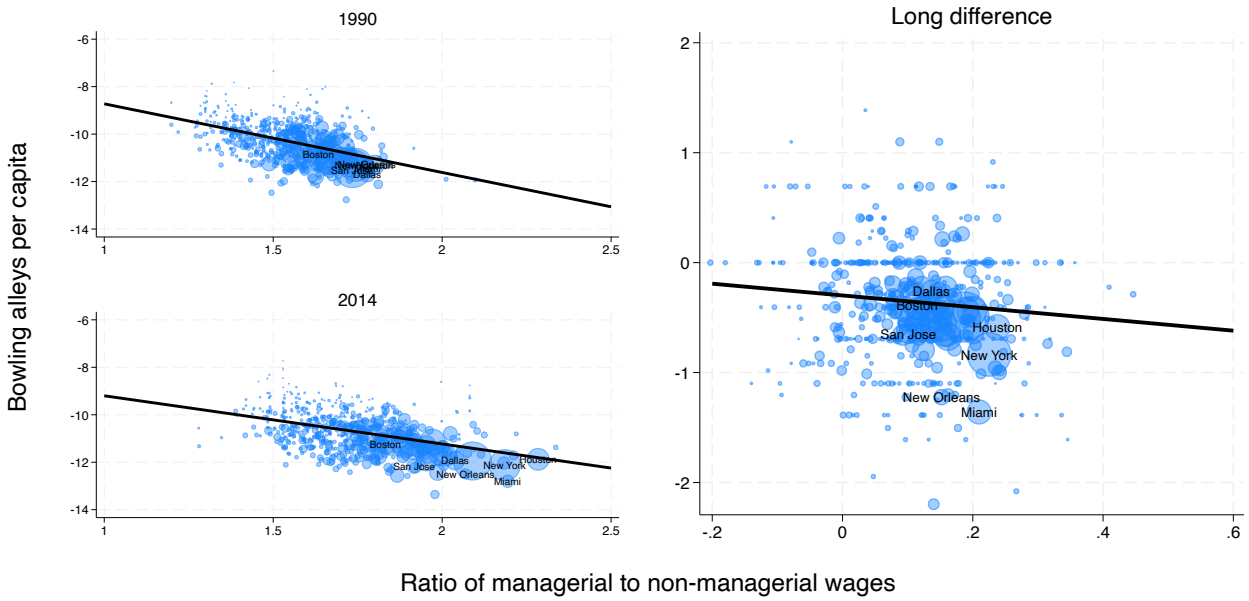
Notes: Ratio of managerial to non-managerial private school enrollment is the ratio of private school enrollment rate of children or dependents of managers minus the private school enrollment rate of non-managers (defined as in Figure 1) in the commuting zone. The sample includes all 722 commuting zones, and the bivariate regression line (unweighted and no controls) is displayed in each panel. The regression coefficients are 0.156 (s.e. = 0.014) for 1990, 0.109 (s.e. = 0.009) for 2014,and 0.059 (s.e. = 0.014) for long differences. Data Source: IPUMS-Census and ACS. See Online Appendix for further details and robustness checks.

(nonmanagerial) workers is larger, managers withdraw from the community by segregating residentially. Figure 2 documents another kind of community withdrawal: the likelihood that managers send their children to private school, relative to the likelihood that workers do. This figure has the same format as Figure 1 and depicts a similar pattern: both in cross sections and long differences, greater inequality between managerial and workers is associated with relatively more private schooling by managers.[5]

Figure 3 establishes that our managerial inequality measure is also correlated with the decline of civic life, as proxied by the log number of bowling alleys per capita in a commuting zone. This variable is inspired by Putnam (2000), who famously emphasized bowling alleys as a proxy for local community engagement. In this and the next two figures, we use the population in 1990 as the denominator in both 1990 and the mid-2010s, in order to avoid any correlation introduced by endogenous changes in commuting zone population. The figure thus suggests that

5. We focus on private schooling by managers relative to workers because there are significant differences across commuting zones in the quality of public schooling, which affects the likelihood of all residents using private schools. In interpreting the results with this variable, note also that private schooling may be affected by the income differences between managers and workers. Private schooling is also influenced by residential segregation, since when rich households live in well-off enclaves, their children are more likely to enroll in the high-quality public schools of their neighborhoods. This is particularly true in large commuting zones, and may explain why weighted results are a little weaker for this variable (see Online Appendix). Finally, we do not use logs for this variable, since private schooling of nonmanagerial households is zero in a significant number of commuting zones.

Figure 3: Bowling alleys per capita



Notes: Bowling alleys per capita is the logarithm of the number of bowling alleys divided by population of the commuting zone in 1990. Our sample for bowling alleys includes the 560 commuting zones with data for this variable. The bivariate regression line (unweighted and no controls) is displayed. The regression coefficients are: -2.692 (s.e. = 0.226) for 1990, -1.963 (s.e. = 0.211) for 2014, and -0.535 (s.e. =0.244) for long differences., Data Source: IPUMS-Census, ACS and Northeast Regional Center for Rural Development. See Online Appendix for further details and robustness checks.

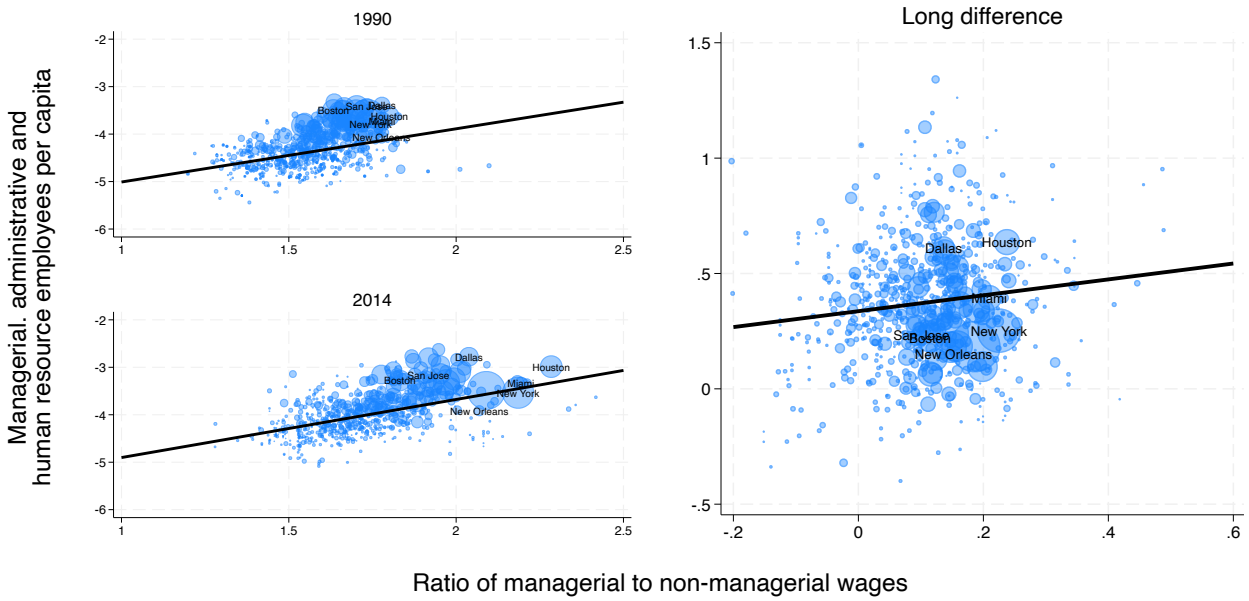
there is a broader decline in community activity in labor markets where the relative earnings of regular workers have fallen.

Finally, Figures 4 and 5 provide suggestive evidence that some important changes in the organization of production are correlated with the trends documented in Figures 1–3. Figure 4 shows that the number of "monitoring workers" (managers, administrative workers and human resource employees) relative to population has risen in commuting zones where manager-worker inequality has increased. Figure 5 indicates that there are more labor complaints per capita in these commuting zones as well. These figures indicate that in local labor markets where workers have fared relatively worse, we see more worker monitoring and top-heavy firm organization, as well as more discontent among workers.[6]

We will interpret these five stylized facts as resulting from a shift from a *soft equilibrium* towards a *tough equilibrium*. In our conceptualization, a *soft management regime* involves managers paying higher wages, monitoring workers less intensively, and engaging in workplace favor or gift exchange with workers—for example, by providing greater flexibility and better amenities in return for greater effort and loyalty to the company. In contrast, in a *tough management regime*, more intensive monitoring supports lower (efficiency) wages for workers,

6. For these two variables, the long-differences relationship is somewhat weaker and not always statistically significant (see Online Appendix).

Figure 4: Managerial, administrative and human resource employees per capita



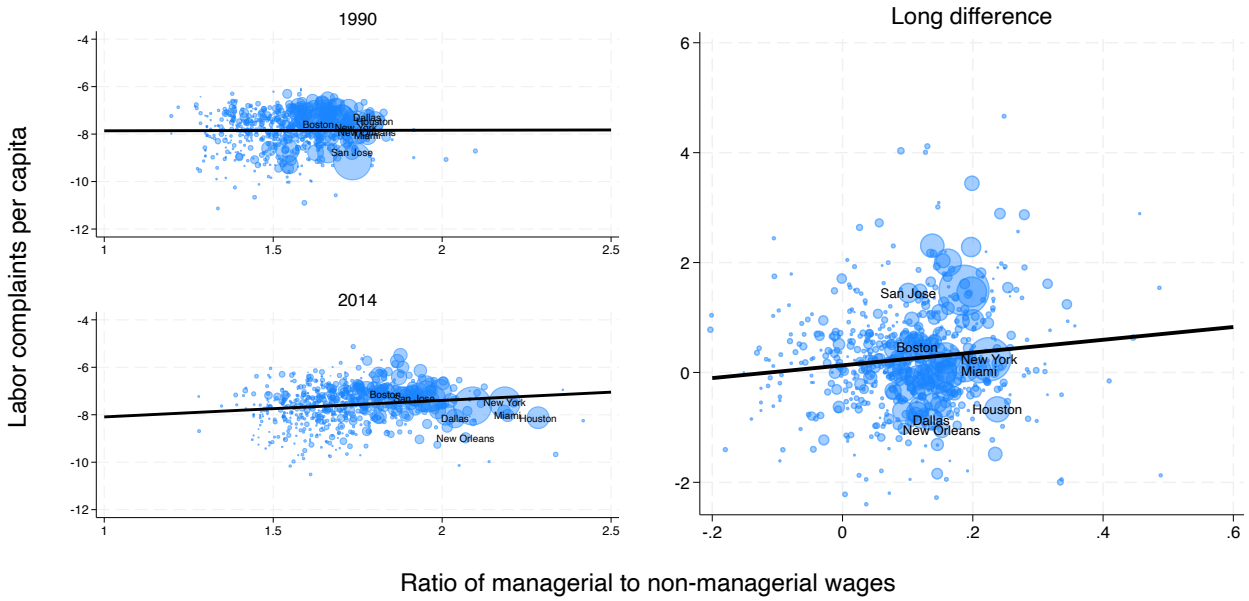
Notes: Managerial, administrative and human resource employees per capita is the logarithm of the number of managerial, administrative and human resource employees divided by the population of the commuting zone in 1990. The sample includes all 722 commuting zones. The bivariate regression line (unweighted and no controls) is displayed in each panel. The regression coefficients are: 1.121 (s.e. = 0.112) for 1990, 1.224 (s.e. = 0.103) for 2014, and 0.344 (s.e. = 0.109) for long differences. Data Source: IPUMS-Census and ACS. See Online Appendix for further details and robustness checks.

and workplace favor exchange is more limited. A shift from a soft regime to a tough one thus leads to lower worker wages (relative to managerial earnings), more monitoring activities, and more discontent among workers, matching the patterns in Figures 4 and 5. More broadly, the distinction between tough and soft management captures the contrast between organizations focused on cost-cutting and strict worker control, and those that emphasize greater cooperation with workers, or even ideas related to "welfare capitalism", where workers are viewed as key corporate stakeholders (Commons 1934).[7]

A key feature of our framework is that employment and community relations are interlinked. A soft management regime generates greater worker wages and employment rents, which encourage workers to contribute more to local public goods and civic activities. Conversely, soft management is supported by the threat of excluding tough managers from community benefits. A soft management regime thus supports, and is also supported by, high-level of community engagement, resulting in a *soft equilibrium*. Conversely, a tough management regime leads to a *tough equilibrium* with lower community engagement. Consequently, a shift away from a soft equilibrium toward a tough equilibrium entails more residential segregation and private

7. The evidence in Acemoglu, He, and Maire (2023) is partially consistent with our distinction between tough and soft management: wages and the labor share are lower, and worker quits are higher, in firms run by CEOs with business degrees. However, that paper does not find evidence of more intensive monitoring and does not explore whether business-educated managers affect workplace favor exchange.

Figure 5: Labor complaints per capita



Notes: Labor complaints per capita is the logarithm of the number of labor complaints recorded by Occupational Safety and Health Administration (OSHA) divided by the population of the commuting zone in 1990. For this variable, 1990 refers to the average of the 1980s, and 2014 refers to the average of 2010s. The sample includes all the 671 commuting zones with data on labor complaints. The bivariate regression line (unweighted and no controls) is displayed in each panel. The regression coefficients are: 0.052 (s.e. = 0.232) for the 1980s, 0.646 (s.e. = 0.203) for the 2010s, and 1.162 (s.e. = 0.417) for long differences. Data Source: IPUMS-Census, ACS and OSHA. See Online Appendix for further details and robustness checks.

schooling by managers (as we explain in more detail in Section 4) and less local community engagement, in line with the patterns documented in Figures 1, 2, and 3.

Model and Results. Our formal framework considers repeated interactions between two types of agents—managers and workers—in workplaces and communities. Workplace and community interactions alternate, with the former in odd periods and the latter in even periods (e.g., weekdays and weekends). Our model is thus one of *multi-activity contact* (Bernheim and Whinston, 1990).

In community interactions, both managers and workers exert costly effort, which benefits all community members. This effort is observable, and can be motivated by the threat of social ostracism and exclusion from community benefits. For workers, it is additionally motivated by the threat of exclusion from future employment opportunities, for example, because workers without a good community standing may be blacklisted by managers or fail to receive job recommendations from fellow community members. In our full model, managers are also motivated by the threat of losing workers' trust in future employment relations. Thus, the rents that workers and managers earn in the labor market induce them to exert greater effort in the community. Conversely, a manager who treats her workers badly can be excluded from the community.

In workplaces, managers choose between low-intensity and high-intensity worker monitoring, and in our full model, they additionally have the opportunity to treat their workers well by doing costly but socially valuable favors for them (e.g., providing flexibility and amenities). If workers trust that managers will treat them well, worker effort is incentivized by both wages and favor exchange, and managers choose low-intensity monitoring, which leaves workers with high rents. This is the *soft management regime*. In contrast, if workers do not trust managers, worker effort must be motivated purely by wages, and managers choose high-intensity monitoring to reduce the required wage payments. This is the *tough management regime*. While worker rents are always higher in a soft regime, manager rents (profits) can be higher in either regime: in the soft regime, managers must provide higher worker rents, but worker rents are less costly to deliver due to favor exchange, and managers also save on monitoring costs. Tough management is always an equilibrium, while soft management is an equilibrium only if the threat of losing community benefits is sufficiently severe for managers.[8]

Welfare—taking into account both employment rents and community benefits—is generally higher for workers in a soft equilibrium, and can also be higher for managers in a soft equilibrium, even when managers' profits are greater in a tough equilibrium. This is because employment rents motivate workers to contribute to the community, which benefits managers as well as other workers. Thus, although each manager may individually gain from being tough, when all managers are tough, worker employment rents and community effort are reduced, which can make all managers worse off.

The interaction of employment rents and community effort drives several novel comparative static results. First, technological changes that make intensive monitoring more informative or less expensive can make everyone worse off: such changes encourage managers to adopt intensive monitoring, which destroys the soft equilibrium and reduces community cooperation. Second, expanded opportunities for automation, offshoring, or outsourcing can make everyone worse off, because they reduce worker employment rents and hence adversely affect community cooperation. Third, a higher minimum wage can benefit everyone by discouraging managers from deviating from the soft equilibrium by adopting intensive monitoring and reducing wages. Fourth, an improvement in managers' ability to opt out of community interactions—e.g., by forming segregated residential enclaves, or sending their children to private schools—can make everyone worse off. Notably, this happens even when managers do not actually opt out, because the mere presence of outside options for managers lessens the threat of exclusion, depressing their equilibrium contributions to the community. Finally, while in general improvements in workplace productivity can favor either a soft or tough equilibrium, they favor a tough equi-

8. In the full model, the existence of a soft equilibrium also requires that managers can be trusted to do costly favors for their employees, which depends on their expected benefits from future employment relations and future community interactions.

We also consider the possibility of a *tough-but-fair equilibrium*, where managers choose high-intensity monitoring but are nonetheless trusted to provide favors for workers.

librium in the realistic case where a larger workforce creates economies of scale in monitoring and diseconomies of scale in favor exchange.

The rest of the paper is organized as follows. Section 2 introduces a simplified version of our model, which is useful for transparently presenting the most novel aspects of our framework. Building towards our full model, Section 3 introduces workplace favor exchange into this stripped-down model. Section 4 allows managers to opt out of the community, while Section 5 allows managers to decide the level of employment. Section 6 discusses our relationship and contribution to the literature, and Section 7 concludes. Appendix A includes proofs omitted from the text, while the Online Appendix provides additional details and robustness checks for the patterns documented in the Introduction.

2 A Model of Employment and Community Relations

This section presents our baseline model of employment and community interactions. The baseline model is simplified by excluding three elements of our overall framework: favor-exchange in employment relationships; outside alternatives to community interactions; and firm size choice by managers. These are studied in Sections 3, 4, and 5, respectively. In this stripped-down version of our model, only tough and soft equilibria are possible, and how they are sustained as a result of the interplay of employment and community incentives can be seen most transparently.

2.1 Model Preliminaries

The economy consists of a mass $\beta > 1/2$ of identical workers and a mass $1 - \beta$ of identical managers. All agents are infinitely lived and discount future payoffs with a common discount factor $\delta \in (0, 1)$.

In odd periods, workers and managers match to engage in a one-shot, bilateral employment relationship. Matching is random, except that each manager can place any subset of workers on her "blacklist," which means that she will never match with them. To preview, blacklisting will not occur in equilibrium, and, since $\beta > 1/2$, along the equilibrium path each manager always matches with a worker, but some workers do not find employment.[9] This last feature will make blacklisting credible in equilibrium, as employers who blacklist some workers still find matches. The timing and payoffs in an employment relationship are described in the next subsection.

In even periods, all agents choose how much community effort to exert. This effort is a public good that benefits everyone, except that each agent can choose to "exclude" (at no cost) any

9. The key feature of the matching process is that it is uniformly random among non-blacklisted workers (because after a deviation, a measure-zero set of workers will be all blacklisted by a measure-one set of managers). There is thus no need to specify how matching works under more complex patterns of blacklisting.

From an empirical perspective, blacklisting by managers can be viewed as resulting from a lack of good recommendations from community members.

subset of the others from benefitting from her contributions. Like blacklisting from employment opportunities, exclusion in community interactions will not occur along the equilibrium path, so community effort is a pure public good.

An agent's overall payoff is the discounted sum of her employment rents (in odd periods) and her community benefits (in even periods). We assume that the game starts in period 1 (an odd period), so each agent's total payoff is a weighted average of her employment and community payoffs with weights $1/(1+\delta)$ and $\delta/(1+\delta)$, respectively.

While the model and equilibrium concept will end up being relatively simple, describing them fully takes a few steps. Section 2.2 describes the timing and payoffs in employment interactions, and Section 2.3 does the same for community interactions. Section 2.4 describes agents' information and defines an equilibrium. Section 2.5 derives incentives in employment interactions, and Section 2.6 does the same for community interactions. Crucially, these incentives interact: future payoffs in each type of interaction affect incentives in the other. Finally, Section 2.7 characterizes when different types of equilibria exist.

2.2 Employment Relations: Timing and Payoffs

The timing of an employment relationship between a matched worker and manager is as follows:

1. The manager offers the worker a *contract*. This consists of a choice of monitoring intensity—low or high—and a wage $w \geq 0$, which is paid to the worker if the worker is not caught shirking. Choosing high-intensity (or "intensive") monitoring costs the manager $k > 0$.

2. The worker observes the contract and decides whether to accept or reject it. If the worker rejects the contract, both parties get payoff 0 in the current period.

3. If the worker accepts the contract, he decides whether to exert effort or shirk. Effort costs the worker $c > 0$ and provides an expected benefit of $y > c$ to the manager. The cost and benefit of shirking are normalized to 0.

4. If the worker shirks, he gets caught with probability p under low-intensity monitoring, and with probability $q > p$ under high-intensity monitoring. If the worker is not caught shirking (either because he worked or because he shirked but did not get caught), he gets paid w. Otherwise, he gets paid 0.

In sum, the manager's payoff from an employment relationship can be written as

$$\Pi^M = \mathbf{1}\{\text{worker works}\}\, y - \mathbf{1}\{\text{worker not caught shirking}\}\, w - \mathbf{1}\{\text{high monitoring}\}\, k,$$

where $\mathbf{1}\{\cdot\}$ is the indicator function, while the worker's payoff from the employment relationship is

$$\Pi^W = \mathbf{1}\{\text{worker not caught shirking}\}\, w - \mathbf{1}\{\text{worker works}\}\, c.$$

In this section, we say that a manager who chooses low monitoring is *soft*, while a manager who chooses high monitoring is *tough*.

To focus on the most interesting parameter region, we assume that

$$y - \frac{c}{q} - k \geq \max\left\{y - \frac{c}{p}, 0\right\}. \tag{1}$$

Inequality (1) ensures that in our stripped-down model the profit of a tough manager is greater than that of a soft manager, and is non-negative.

We also define the constant

$$\rho = \frac{q-p}{pq}c.$$

We will see that ρ is the difference in a worker's rent under low and high monitoring. Note that (1) implies that $\rho \geq k$. Thus, it is profitable for the manager to pay a cost of k to shift a rent of ρ from the worker to herself.

Overall, an employment interaction can be viewed as a simple efficiency wage game as in Shapiro and Stiglitz (1984), where managers can increase monitoring in order to reduce workers' rents as in Acemoglu and Newman (2002).

2.3 Community Interactions: Payoffs

In a community interaction, each agent (worker or manager) chooses a community effort level $a \geq 0$ at a cost of a, and also decides whether to exclude any subset of agents from the benefits of her effort. Excluded agents do not benefit from others' community effort, the interpretation being that they are excluded or ostracized from community activities. Because, as noted above, exclusion does not occur along the equilibrium path, community effort is a pure public good. It captures, among others, such things as keeping the neighborhood clean and safe; participating in local civic or religious activities; sharing information about, and providing recommendations for, employment opportunities; and providing informal insurance.

Formally, if workers and managers exert effort a^W and a^M, respectively, community benefits are given by

$$B\left(a^W, a^M\right) = \beta\alpha b\left(a^W\right) + (1-\beta)\,\alpha b\left(a^M\right),$$

where $b : \mathbb{R}_+ \to \mathbb{R}_+$ is an increasing and concave function satisfying $b(0) = 0$, and $\alpha > 0$ is a parameter measuring the importance of community benefits. We assume that the function b satisfies the Inada conditions $\lim_{a\to 0} b'(a) = \infty$ and $\lim_{a\to\infty} b'(a) = 0$. The payoffs from

community interactions for workers and managers are given by:[10]

$$V^W\left(a^W, a^M\right) = B\left(a^W, a^M\right) - a^W \qquad \text{and} \qquad V^M\left(a^W, a^M\right) = B\left(a^W, a^M\right) - a^M. \tag{2}$$

Overall, a community interaction can be viewed as a continuum-agent, continuous-action prisoner's dilemma, with the possibility of excluding some agents.

2.4 Observability and Equilibrium

Incentives in employment and community interactions depend on the observability of the actions taken in these settings. Our observability assumptions encode the view that information about community interactions and manager employment practices are shared reasonably well within communities, while individual workers' employment terms and outcomes are more private.

Specifically, we assume that all managerial decisions, except the wage offer w, are publicly observed. The assumption that individual wage offers are unobserved is a natural starting point given the anonymous nature of employment relations. It also simplifies our analysis, as otherwise wages could be influenced by repeated game considerations and could be indeterminate. Specifically, this assumption ensures that managers set wages "myopically," subject to worker incentive constraints.

For workers, we assume that only the community effort decision a is publicly observed. In particular, workplace effort and contract acceptance or rejection are unobserved. This implies that a worker cannot be blacklisted by future employers or ostracized in the community for shirking in an employment relationship, or for accepting or refusing employment.[11]

We can now define strategies and introduce our equilibrium concept. The *public history* of the game describes all publicly available information: the past actions of each manager except for her wage offers, and the past community effort of each worker. We focus on *public strategies*, where all agents' decisions depend only on the public history, with the exception that a worker's behavior in an employment relation can also depend on the current wage offer. Thus, a public strategy for a manager specifies, as a function of the public history, (1) which workers (if any) to blacklist and thus exclude as possible matches; (2) what contract (monitoring intensity and wage) to offer her worker; and (3) how much community effort to exert and which agents to exclude from community benefits. Similarly, a strategy for a worker specifies, as a function of the public history, (1) for any contract, whether to accept employment; and if so whether to

10. In general, the payoff for an agent who exerts effort a and is excluded by fraction μ^W of workers and μ^M of managers is $\beta\left(1-\mu^W\right)\alpha b\left(a^W\right) + (1-\beta)\left(1-\mu^M\right)\alpha b\left(a^M\right) - a$. Along the equilibrium path, $\mu^W = \mu^M = 0$ and thus workers' and managers' payoffs are given by (2).

11. This feature simplifies the model by ruling out "second-order punishments," wherein managers are deterred from being tough by the threat that workers will not work for them, because in turn workers who work for blacklisted firms can themselves be themselves blacklisted. We leave the study of alternative observability assumptions—for example, where wages are affected by repeated game concerns, or where workers who are caught shirking are blacklisted by all managers—to future work.

shirk, and (2) how much community effort to exert and which agents to exclude from community benefits.[12] We also restrict attention to *symmetric* strategy profiles, where all managers and all workers use the same strategy. A *perfect public equilibrium* is a profile of symmetric public strategies that forms a Nash equilibrium starting from any public history.

Finally, we focus on perfect public equilibria where, on path, all workers work, no one is blacklisted or excluded from community benefits, and the community effort levels a^W and a^M are set to their maximum incentive compatible levels. We will see in Section 2.6 that all Pareto efficient perfect public equilibria are included in this class, provided that the discount factor δ is below a threshold $\bar{\delta}$.[13] Henceforth, we refer to a perfect public equilibrium in this class as an *equilibrium*.

An equilibrium is thus fully described by the prevailing management regime (soft or tough), the wage level w, and the community effort levels a^W and a^M. We call an equilibrium soft or tough after the prevailing regime.

We first derive incentives in employment relations (which determine w as a function of the management regime), then analyze incentives in community interactions (which determine a^W and a^M as a function of w and the management regime), and finally determine the conditions for the existence of an equilibrium with each management regime (which, by the preceding observations, determines w, a^W, and a^M, and hence completely specifies the equilibrium).

To preview, an equilibrium will involve two kinds of synergies between employment and community interactions. First, managers can be excluded from community benefits if they deviate from the prescribed regime, and in particular if they deviate from soft to tough management. The Hormel example in the Introduction illustrates this mechanism. Second, workers who do not provide sufficient community benefits can be blacklisted, which captures our discussion in the Introduction about how workers who are not in good community standing will not receive valuable job recommendations.[14]

2.5 Employment Relations: Wages and Worker Incentives

Since wage offers as well as worker behavior within an employment relation are not publicly observed, the wage in each management regime is uniquely determined as the lowest wage that motivates the worker to exert effort. We now characterize these wages—as well as each agent's payoff—for each management regime.

Soft regime: If a manager chooses low monitoring and offers wage w, the worker's expected

12. If all other agents use public strategies, an agent always has a best response in public strategies, as there is no benefit to conditioning one's behavior on past wage offers or past worker actions when others do not.

13. If instead $\delta > \bar{\delta}$ (contrary to what we will assume), community effort can be above the first-best level.

14. When we introduce workplace favor exchange in Section 3, there will be an additional channel: managers who do not provide enough community benefits can lose workers' trust that they will provide favors in future employment relations.

payoff is $w - c$ if he works and $(1-p)\,w$ if he shirks. The lowest wage that induces work is thus

$$w = \frac{c}{p}.$$

Payoffs (i.e., "rents") in the employment relation for the worker and manager, respectively, are then given by

$$\Pi_S^W = w - c = \frac{1-p}{p}c \qquad \text{and} \qquad \Pi_S^M = y - \frac{c}{p},$$

and the total employment surplus is given by

$$\bar{\Pi}_S = \Pi_S^W + \Pi_S^M = y - c.$$

Tough regime: If a manager chooses high monitoring and offers wage w, the worker's expected payoff is $w - c$ if he works and $(1-q)\,w$ if he shirks. The lowest wage that induces work is thus

$$w = \frac{c}{q},$$

and employment rents and surplus are given by

$$\Pi_T^W = w - c = \frac{1-q}{q}c, \qquad \Pi_T^M = y - \frac{c}{q} - k, \qquad \text{and} \qquad \bar{\Pi}_T = \Pi_T^W + \Pi_T^M = y - c - k.$$

Note that the difference in manager profit between the tough and soft regimes is $\rho - k$, which is non-negative by (1):

$$\Pi_T^M - \Pi_S^M = \rho - k \geq 0.$$

Worker and manager employment rents and total employment surplus can be ranked across the management regimes as follows:

$$\Pi_S^W > \Pi_T^W > 0, \qquad \Pi_T^M \geq \max\left\{\Pi_S^M, 0\right\}, \qquad \text{and} \qquad \bar{\Pi}_S > \bar{\Pi}_T > 0. \tag{3}$$

These inequalities are intuitive. Worker rents are higher in a soft equilibrium, and are lower—but still positive—in a tough equilibrium. Manager rents are higher in a tough equilibrium by (1). Total employment surplus is higher in a soft equilibrium, which economizes on the cost of high monitoring.

Remark 1 As discussed in the Introduction, we interpret the empirical trends documented in the Introduction as reflecting a shift from soft to tough management regime. As (3) indicates, such a shift always reduces workers' employment rents and increases managers' employment rents, under our assumption that $\rho \geq k$. Whenever managers' employment rents are higher than workers', this shift also increases inequality between workers and managers. Finally, note also that under these assumptions, a shift from soft to tough management reduces labor demand,

in the sense that the wage at a given level of employment declines.

2.6 Community Interactions: Incentives for Community Effort

A pair of community effort levels a^W for workers and a^M for managers can be sustained in equilibrium if and only if they are enforced by the threat of the most severe possible punishments in future employment and community interactions. It is thus without loss to assume that:

- If a worker fails to exert community effort a^W, he is excluded from all future community benefits and is blacklisted by all managers. His continuation payoff is therefore 0 in every period.
- If a manager fails to exert community effort a^M, she is excluded from all future community benefits. However, she can continue to hire workers and obtain employment rent Π_T^M.[15] Her continuation payoff is therefore 0 in even periods and Π_T^M is odd periods.

A pair of community effort levels $\left(a^W, a^M\right)$ is thus *incentive compatible* if

$$a^W \leq \frac{\delta}{1-\delta^2}\frac{1-\beta}{\beta}\Pi^W + \frac{\delta^2}{1-\delta^2}V^W\left(a^W, a^M\right) \qquad \text{and} \tag{4}$$

$$a^M \leq \max\left\{\frac{\delta}{1-\delta^2}\left(\Pi^M - \Pi_T^M\right) + \frac{\delta^2}{1-\delta^2}V^M\left(a^W, a^M\right), 0\right\}. \tag{5}$$

In these inequalities, $\Pi^W \in \left\{\Pi_S^W, \Pi_T^W\right\}$ and $\Pi^M \in \left\{\Pi_S^M, \Pi_T^M\right\}$ are determined according to the equations in the previous subsection, depending on the equilibrium management regime. To derive these inequalities, note that the best deviation for a worker is taking 0 community effort, which saves an effort cost of a^W, but incurs a future utility loss of $\frac{1-\beta}{\beta}\Pi^W$ in odd periods (as a non-blacklisted worker finds employment with probability $\frac{1-\beta}{\beta}$) and $V^W\left(a^W, a^M\right)$ in even periods. Similarly, the best deviation for a manager is taking 0 community effort, which saves an effort cost of a^M, but incurs a future utility loss of $\Pi^M - \Pi_T^M$ in odd periods and $V^M\left(a^W, a^M\right)$ in even periods. In (5) there is a maximum with 0 because the first term on the right-hand side is negative in a soft equilibrium since $\Pi^M = \Pi_S^M < \Pi_T^M$.

When a^W and a^M are the maximal incentive compatible community efforts, (4) and (5) both hold with equality.[16] Substituting for $V^W\left(a^W, a^M\right)$ and $V^M\left(a^W, a^M\right)$ using (2) and isolating

15. A deviant manager can still profitably hire workers because managers are always in short supply ($\beta > 1/2$) and employment relations are anonymous (so that manager deviations in workplaces are not observed by outsiders). If we extended the model by letting workers blacklist managers (as well as the other way around), it would not be credible for them to do so, because a worker strictly prefers to work for a tough manager rather than remaining unemployed.

16. Otherwise, at least one of a^W or a^M could be increased without violating (4)–(5).

a^W and a^M, this gives

$$a^W = \delta \frac{1-\beta}{\beta} \Pi^W + \delta^2 B\left(a^W, a^M\right) \qquad \text{and} \tag{6}$$

$$a^M = \max\left\{\delta\left(\Pi^M - \Pi_T^M\right) + \delta^2 B\left(a^W, a^M\right), 0\right\}. \tag{7}$$

The following lemma says that there exists a component-wise largest pair $\left(a^W, a^M\right)$ that satisfies (6) and (7); it displays monotone comparative statics with respect to Π^W and $\Pi^M - \Pi_T^M$; it Pareto dominates any other incentive compatible pair $\left(\tilde{a}^W, \tilde{a}^M\right)$ whenever the discount factor is below a threshold $\bar{\delta}$; and it involves higher community effort from workers than managers.

Lemma 1 *1. For any Π^W, Π^M, Π_T^M, and δ, there exists a unique pair $\left(a^W, a^M\right)$ satisfying (6) and (7) such that $\left(a^W, a^M\right) \geq \left(\tilde{a}^W, \tilde{a}^M\right)$ for any incentive compatible pair $\left(\tilde{a}^W, \tilde{a}^M\right)$.*

2. a^W is strictly increasing in Π^W and δ, and is increasing in $\Pi^M - \Pi_T^M$, strictly so when $a^M > 0$.

3. a^M is increasing in Π^W, $\Pi^M - \Pi_T^M$, and δ, strictly so when $a^M > 0$.

4. There exists $\bar{\delta} > 0$ such that, for any $\delta < \bar{\delta}$, the pair $\left(a^W, a^M\right)$ Pareto dominates any incentive compatible pair $\left(\tilde{a}^W, \tilde{a}^M\right)$. That is,

$$0 \leq B\left(\tilde{a}^W, \tilde{a}^M\right) - \tilde{a}^W \leq B\left(a^W, a^M\right) - a^W \quad \text{and} \quad 0 \leq B\left(\tilde{a}^W, \tilde{a}^M\right) - \tilde{a}^M \leq B\left(a^W, a^M\right) - a^M.$$

5. $a^W > a^M$.

The intuition for the first four parts of the lemma is that, when $\delta < \bar{\delta}$, the maximal incentive compatible community effort levels, $\left(a^W, a^M\right)$, are below first-best and thus, increasing either group's effort raises both groups' utilities. This implies that $V^W\left(a^W, a^M\right)$ and $V^M\left(a^W, a^M\right)$ are both positive and increasing in a^W and a^M, and thus any incentive compatible pair of effort levels other than the maximal one is Pareto dominated. We henceforth assume that $\delta < \bar{\delta}$.

The last part of the lemma follows because $\Pi^W > 0$ but $\Pi^M - \Pi_T^M \leq 0$, which implies that $a^W > \delta^2 B\left(a^W, a^M\right) \geq a^M$. Intuitively, workers who deviate in community interactions lose future employment rents, while managers who deviate in the community obtain more rents in future employment interactions by switching to tough management, so the maximum incentive compatible community effort level is higher for workers than managers.[17]

17. We will see that this comparison can be overturned once we introduce favor exchange in employment relations in Section 3.

2.7 Equilibrium Characterization

We now determine the conditions under which an equilibrium with each management regime—soft and tough—exists. An equilibrium with a given management regime exists if and only if a manager cannot profitably deviate to the other regime. Whenever an equilibrium with a given management regime exists, the equilibrium wage is determined as in Section 2.5, and the equilibrium community effort levels are then determined as in Section 2.6.

Soft equilibrium: A soft equilibrium exists if and only if it is unprofitable for a soft manager to deviate by adopting high monitoring. Recall that a soft manager's equilibrium payoff, starting in an employment period, is $\left(\Pi_S^M + \delta V^M\left(a^W, a^M\right)\right)/(1+\delta)$. If a soft manager deviates to high monitoring, her payoff is $\Pi_T^M/(1+\delta)$. Hence, this deviation is unprofitable if and only if

$$\Pi_T^M \leq \Pi_S^M + \delta V^M\left(a^W, a^M\right) \quad \Longleftrightarrow \quad \rho - k \leq \delta V^M\left(a^W, a^M\right). \tag{8}$$

Thus, a soft equilibrium exists if and only if $\rho - k$ (the difference between manager profits in a tough and soft equilibrium) is less that δ times a manager's payoff from community interactions.

Tough equilibrium: By assumption (1), a tough manager cannot gain by deviating to low monitoring. Hence, a tough equilibrium always exists .

We next compare welfare between soft and tough equilibria. Recall that each agent's total payoff is a weighted average of her employment and community payoffs with weights $1/(1+\delta)$ and $\delta/(1+\delta)$, respectively. Hence, an agent of type $i \in \{W, M\}$ is better-off in the soft equilibrium if and only if

$$\Pi_S^i + \delta V_S^i \geq \Pi_T^i + \delta V_T^i.$$

For example, a manager is better-off in the soft equilibrium if her discounted gain in community payoffs, $\delta\left(V_S^M - V_T^M\right)$, is greater than her loss in employment payoffs, $\Pi_T^M - \Pi_S^M = \rho - k$. Since community effort levels can be higher in a soft equilibrium, as workers obtain higher employment rents in a soft equilibrium, this condition is satisfied for many model parameters. The logic of the resulting Pareto inefficiency is that, while each manager individually benefits from adopting tough management practices, doing so imposes a negative externality on workers, as well as ultimately on other managers, because it reduces worker employment rents and community effort.

We summarize these results in the following proposition.

Proposition 1 *1. A tough equilibrium always exists.*

2. *A soft equilibrium exists if and only if the manager incentive constraint (8) holds, where the pair of community effort levels $\left(a^W, a^M\right)$ is the largest solution to (6) and (7), with $\Pi^W = \Pi_S^W$ and $\Pi^M = \Pi_S^M$.*

3. *For some parameters, the soft equilibrium Pareto dominates the tough equilibrium. In*

particular, managers can be better-off in the soft equilibrium despite making higher profits in the tough equilibrium.

The proof of Proposition 1 in Appendix A provides an explicit example illustrating part 3.

We next give some simple comparative statics for when a soft equilibrium exists, as well as for welfare in a soft equilibrium. We say that the soft equilibrium is "favored" by an increase in parameter ζ if, for any fixed values of the other parameters and any parameter values $\zeta < \zeta'$, whenever the soft equilibrium exists for parameter value ζ, it also exists for parameter value ζ'.

Proposition 2 *The existence of a soft equilibrium is favored by an increase in δ, α, or k, by a decrease in q, or by a simultaneous increase in p and c that keeps worker rents $\frac{1-p}{p}c$ constant. Moreover, in a soft equilibrium all agents' utilities are increasing in α and k, and are decreasing in q.*

In sum, a soft equilibrium tends to exist when agents are more patient, when community benefits are more valuable, when high monitoring is more expensive or less precise, or (holding worker rents fixed) when low monitoring is more precise.[18] These results are all intuitive, once we recall that a soft equilibrium exists if and only if it is unprofitable for a manager to deviate by adopting high monitoring, and this is supported by exclusion from future community benefits. Hence, higher profits from tough equilibrium make the soft equilibrium harder to maintain, while more valuable community benefits make it easier to sustain. The welfare comparative statics for k and q work through the incentive compatibility constraints that determine the maximum community effort levels, (6) and (7). Namely, making intensive monitoring more costly or less accurate increases welfare in a soft equilibrium it makes a deviation to the tough equilibrium less attractive for managers.

3 Workplace Favor Exchange

We now introduce favor exchange in employment relations. We assume that an employment relation consists of the four stages described in Section 2.2, followed by a fifth stage:

5. If the worker is not caught shirking, the manager decides whether or not to do a favor for the worker. The favor costs the manager $e > 0$ and provides a benefit $d \in (e, c)$ to the worker. The manager's decision to do a favor is publicly observed.

   The observability of all other actions, and the solution concept, remain unchanged from Section 2.2.

18. The effect of an increase in p for a fixed effort cost c is ambiguous, because this may decrease a^W via (6) and hence decrease $V^M\left(a^M, a^W\right)$.

Favors can capture workplace amenities, flexibility in job terms, well-paid overtime work, on-the-job training, or recommendations for future jobs. Favors are non-contractable but are a more efficient way of transferring a limited amount of utility to workers than increasing the contracted wage. In other words, because $e < d < c$, it is efficient to motivate effort through a mix of wages and a promised favor, rather than wages alone. Nevertheless, providing favors may not be credible—if the manager is not trusted to reward the worker via favors, she must rely on wages alone to induce effort.

Introducing favor exchange let us make three new points:[19]

- *Higher manager profits in soft equilibrium:* Soft management practices can yield higher manager profits in soft equilibrium even if $\rho > k$, because managers are able to monetize the net value of favors, $d - e$, by reducing wages in a soft equilibrium (where the manager chooses low monitoring and does favors for workers who are not caught shirking). Manager profits are now higher in a tough equilibrium (where the manager chooses high monitoring and does not do favors) if and only if

$$\tau = \rho - k - d + e \geq 0.$$

  However, there is also a new constraint on the existence of a soft equilibrium: providing favors must be credible for managers. The model with favors thus features a new form of Pareto inefficiency: a soft equilibrium may fail to exist, even when a soft regime provides higher community benefits, wages *and manager profits* than a tough regime. Moreover, because τ can be negative even when $\rho \geq k$, it is now possible that $\Pi_S^M > \Pi_T^M$, and hence $a^M > a^W$. That is, managers may provide more community benefits than workers, in contrast to the situation in the model without workplace favor exchange.

- *New comparative statics:* Parameter changes that at first glance should improve efficiency—including reductions in k or c, increases in q, or reductions in a minimum wage—can make all agents worse off by destroying the soft equilibrium.

- *Tough-but-fair management*: In this new management regime there is high monitoring but also favors for workers who are not caught shirking. Tough-but-fair management is the most profitable regime for managers, but, like soft management, it can only arise in equilibrium if favors are credible for managers. The tough-but-fair regime can capture management arrangements that combine intensive monitoring with relatively favorable treatment of workers, which are reminiscent to mid-twentieth-century management models such as "Taylorism" (associated with Frederick Winslow Taylor) or "Fordism" (associated with Henry Ford).

19. Favors also bring our model closer to gift exchange or relational contracting models (Akerlof 1982, 1984; Akerlof and Yellen 1986; MacLeod and Malcomson 1989; Levin 2003).

We now describe how our analysis works in the presence of favors. To simplify the analysis, we henceforth assume that

$$y - \frac{c}{p} \leq 0, \tag{9}$$

so that a manager who chooses low monitoring but does not do favors cannot make positive profits.

The first difference with the baseline model is that now, the worker's expected payoff in a soft equilibrium is $w + d - c$ if he works and $(1-p)(w+d)$ if he shirks. The lowest wage that induces work is thus

$$w = \frac{c}{p} - d,$$

and employment rents and surplus are given by

$$\Pi_S^W = w + d - c = \frac{1-p}{p}c, \qquad \Pi_S^M = y - \frac{c}{p} + d - e, \qquad \text{and} \qquad \bar{\Pi}_S = y - c + d - e.$$

In contrast, the equations for Π_T^W and Π_T^M remain unchanged, as managers do not do favors in a tough equilibrium (in contrast to a tough-but-fair equilibrium, which we discuss below).

Next, a soft equilibrium exists if and only if it is unprofitable for a soft manager to deviate by choosing high monitoring or reneging on an expected favor. Recall that a soft manager's equilibrium payoff, starting in an employment period, is $\left(\Pi_S^M + \delta V^M\left(a^W, a^M\right)\right)/(1+\delta)$. If a soft manager deviates to high monitoring, it is without loss of generality to specify that the current worker does not trust the manager to do a favor, so the manager's future profit is $\Pi_T^M/(1+\delta)$. Hence, this deviation is unprofitable if and only if

$$\Pi_T^M \leq \Pi_S^M + \delta V^M\left(a^W, a^M\right) \quad \Longleftrightarrow \quad \rho - k - d + e \leq \delta V^M\left(a^W, a^M\right), \tag{10}$$

where a^W and a^M are the maximal incentive compatible community effort levels under soft employment. In contrast, if a soft manager chooses low monitoring but deviates by reneging on a favor, her payoff is

$$\frac{1-\delta^2}{1+\delta}\left(\Pi_S^M + e\right) + \frac{\delta^2}{1+\delta}\Pi_T^M.$$

So this deviation is unprofitable if and only if

$$\left(1-\delta^2\right)\left(\Pi_S^M + e\right) + \delta^2\Pi_T^M \leq \Pi_S^M + \delta V^M\left(a^W, a^M\right) \quad \Longleftrightarrow \quad \delta^2(\rho - k - d) + e \leq \delta V^M\left(a^W, a^M\right). \tag{11}$$

In total, we see that both (10) and (11) hold—so a soft equilibrium exist—if and only if

$$e + \max\left\{\rho - k - d, \delta^2(\rho - k - d)\right\} \leq \delta V^M\left(a^W, a^M\right). \tag{12}$$

This inequality has a simple interpretation. If $\rho - k - d \geq 0$, then a soft manager who

plans to start forgoing favors will also choose high monitoring starting in the current period. In this case, the binding manager incentive constraint is $e + \rho - k - d \leq \delta V^M$. If instead $\rho - k - d < 0$, then a soft manager who plans to start forgoing favors will choose low monitoring in the current period, but will choose high monitoring in the next employment period. In this case, the binding manager incentive constraint is $e + \delta^2 (\rho - k - d) \leq \delta V^M$. Note that, while these two constraints differ slightly, they are both easier to satisfy when e or ρ is smaller, or when k, d, δ, or V^M is greater.

We next turn to the tough-but-fair regime, where the worker's expected payoff is $w + d - c$ if he works and $(1 - q)(w + d)$ if he shirks. The lowest wage that induces work is thus

$$w = \frac{c}{q} - d,$$

and employment rents and surplus are given by

$$\Pi^W_{TF} = w + d - c = \frac{1 - q}{q} c, \qquad \Pi^M_{TF} = y - \frac{c}{q} - k + d - e, \qquad \text{and} \qquad \bar{\Pi}_{TF} = y - c - k + d - e.$$

Note that a tough-but-fair manager cannot gain by deviating to low monitoring, because this causes the current worker to lose trust that the manager will do a favor, and low monitoring without favors is assumed to be unprofitable. Hence, a tough-but-fair equilibrium exists if and only if the manager cannot gain by reneging on an expected favor. If the manager reneges on a favor, her continuation payoff is

$$\frac{1 - \delta^2}{1 + \delta} \left(\Pi^M_{TF} + e \right) + \frac{\delta^2}{1 + \delta} \Pi^M_T.$$

So this deviation is unprofitable—and thus a tough-but-fair equilibrium exists—if and only if

$$\begin{aligned} \left(1 - \delta^2\right) \left(\Pi^M_{TF} + e \right) + \delta^2 \Pi^M_T &\leq \Pi^M_{TF} + \delta V^M \left(a^W, a^M \right) \quad \Longleftrightarrow \\ e - \delta^2 d &\leq \delta V^M \left(a^W, a^M \right). \end{aligned} \tag{13}$$

Note that if $\rho \geq k$ then (12) implies (13), so whenever there is a soft equilibrium, there is also a tough-but-fair equilibrium. The intuition is that reneging on a favor is more tempting in a soft equilibrium than a tough-but-fair equilibrium, because in the former case the manager can recoup some future losses by adopting high monitoring, while in the latter case she is already using high monitoring.

The following proposition—which generalizes Propositions 1 and 2 to the model with workplace favor exchange—summarizes the above discussion.

Proposition 3 *1. A tough equilibrium always exists. A soft equilibrium exists if and only if the manager incentive constraint (12) holds, where the pair of community effort levels* $\left(a^W, a^M \right)$ *is the largest solution to (6) and (7), with* $\Pi^W = \Pi^W_S$ *and* $\Pi^M = \Pi^M_S$. *A*

tough-but-fair equilibrium exists if and only if (13) holds, where the pair $\left(a^W, a^M\right)$ *is the largest solution to (6) and (7), with* $\Pi^W = \Pi^W_{TF}$ *and* $\Pi^M = \Pi^M_{TF}$.

2. *The existence of a soft equilibrium is favored by an increase in* δ, α, k, *or* d, *by a decrease in* q *or* e, *or by a simultaneous increase in* p *and* c *that keeps worker rents* $\frac{1-p}{p}c$ *constant. Moreover, in a soft equilibrium all agents' utilities are increasing in* α, k, *and* d, *and are decreasing in* q *and* e. *In addition, the conditions for the existence of a soft equilibrium do not depend on* y.

   The existence of a tough-but-fair equilibrium is favored by an increase in δ, α, c, *or* d, *or by a decrease in* q *or* e. *Moreover, in a tough-but-fair equilibrium all agents' utilities are increasing in* α *and* d, *and are decreasing in* q *and* e. *In addition, the conditions for the existence of a tough-but-fair equilibrium do not depend on* y, k, *or* p.

We next establish some key comparative statics, which reveal nuanced effects of community-employment interactions with workplace favor exchange. The basic logic of these results is that parameter changes that undermine the existence of a soft equilibrium, or that reduce workers' employment rents within a given equilibrium regime, can reduce welfare for managers as well as for workers, by undermining favor exchange or by reducing workers' community effort. Notably, this logic applies even when the direct effect of the parameter change is to increase total employment rents

We first highlights these effects in the context of improvements in intensive monitoring (an increase in q or a decrease in k) and the imposition of a minimum wage (a lower bound on w). From the perspective of an employment relation viewed in isolation, better intensive monitoring can only increase managers' profits, and the imposition of a minimum wage can only reduce total welfare (by possibly raising the wage above the manager's willingness to pay). However, both of these standard results can be overturned once we account for the interaction between employment and community interactions.

Proposition 4 1. *Making intensive monitoring more precise or less costly to adopt (that is, increasing* q *or decreasing* k*) can reduce welfare for both workers and managers by destroying the soft equilibrium.*

2. *Imposing a minimum wage for workers who are not fired (that is, imposing a lower bound on* w*) can increase welfare for both workers and managers by creating a soft equilibrium where it did not previously exist.*

The intuition for the first result is that increasing q or decreasing k can destroy the soft equilibrium by making tough management practices more attractive (as in Proposition 2), which can reduce everyone's welfare (as in Proposition 1.3). The intuition for the second result is that

a manager who is constrained in her ability to cut wages following a deviation to intensive monitoring gains less from this deviation.[20]

It is also interesting to consider the impact of introducing a *firing penalty* for workers, which can be modeled as an additional cost ϕ borne by a worker who is caught shirking. A firing penalty captures laws or regulations that make getting fired more painful for workers. For instance, the Master and Servant Acts that made breach of contract a criminal offense in 19th century Britain can be viewed as a firing penalty (Steinfeld 2001; Naidu and Yuchtman 2013). Contemporary non-compete clauses may play a similar role, by making it more difficult for a worker to be hired by a competing employer. With a richer model of worker-firm matching, a firing penalty could also represent the waiting time to match with another employer. Introducing a firing penalty ϕ in the presence of a minimum wage $\underline{w}$ reduces wages to $\max\{c/p - \phi, \underline{w}\}$ under low monitoring and to $\max\{c/q - \phi, \underline{w}\}$ under high monitoring. This shifts employment rents from workers to managers, but also potentially shrinks the wage gap between the soft and tough regimes, which favors the existence of a soft equilibrium.

We next turn to the effects of automation, outsourcing, or offshoring. Our model can capture these phenomena in a reduced-form manner as a reduction in workers' effort costs c together with a (positive or negative) change in the value of this effort for managers, y. The logic behind this modeling approach is that automation, outsourcing, and offshoring all lower local labor requirements for production by shrinking the set of tasks assigned to local workers—either because some of these tasks are now performed by machines (automation) or by workers employed in other firms (outsourcing) or in other countries (offshoring).[21] At the same time, the value managers place on motivating high effort by local workers can either increase (if the remaining locally-sourced tasks are sufficiently complementary with the automated, outsourced, or offshored tasks) or decrease (e.g., because success in the remaining tasks becomes less valuable).

Within each management regime, a reduction in c shifts employment rents from workers to managers. This in turn reduces the maximum incentive compatible level of community effort for workers, while increasing it for managers. If $a^M > a^W$ (which is possible in a soft or tough-but-fair equilibrium), then total community benefits are reduced following this shift, because there are decreasing returns to community effort ($b(\cdot)$ is concave).[22] Because worker

20. The proof gives explicit examples that illustrate these claims. The possibility of favor exchange in employment is important here, because, without favor exchange, managers prefer the soft equilibrium strategy profile to a tough equilibrium only if this strategy profile is an equilibrium, and consequently, destroying the soft equilibrium cannot make managers worse off. In addition, in the constructed example for Proposition 4.1 the tough-but-fair equilibrium does not exist, so the comparison of the soft and tough equilibria is the relevant margin.

21. Our modeling approach captures both offshoring abroad and domestic outsourcing to firms outside the community.

22. If instead $a^M < a^W$, the effect on community benefits is also ambiguous, because reducing c increases managers' employment rents by less than it reduces workers' employment rents.

The effect of automation on worker welfare also become ambiguous once we consider shifts between employ-

employment rents are also decreasing in c, automation leaves workers worse-off overall, while the overall effect on manager welfare is ambiguous.

Proposition 5 *Suppose that automation, outsourcing, or offshoring decreases c, while possibly also increasing or decreasing y. In a soft or tough-but-fair equilibrium, if $\Pi^M - \Pi^M_T \geq \frac{1-\beta}{\beta}\Pi^W$ (which implies that $a^M > a^W$) then community benefits and worker welfare both decrease.*

Proposition 5 can help explain the negative effects that automation, outsourcing, and offshoring can have on local communities by eliminating high-wage jobs. In addition to these effects within each employment regime, part 2 of Proposition 3 implies that a reduction in c makes the tough-but-fair equilibrium less likely to exist, which can also cause a decline in community effort. In line with this interpretation, automation appears to have played a role in the Hormel case mentioned in the Introduction. In particular, Richard Knowlton, the Hormel CEO, arranged a new $100M manufacturing facility shortly before the strike, and was viewed as "an architect of the new business, demanding more from automation and technology than from labor," (Hage and Klauda, 1989, p. 52). This approach followed the contemporary practices of other companies in the meat-packing industry. However, Hormel was much more intertwined with its local community than were its peers in major metropolitan areas. Hormel's automation efforts therefore faced great community resistance, and ultimately had greater consequences for local community life.

Remark 2 In the presence of favor exchange, the relationship between the employment regime and wages is more complicated. The measured (monetary) wage w is $c/p - d$ in a soft equilibrium and c/q in a tough equilibrium. The former is greater than the latter if and only if $\rho \geq d$. In general, a worker's benefit from receiving a favor, d, may include a monetary component, which shows up as part of measured wages: if a fraction η of the benefit d shows up as part of measured wages, then the model predicts that measured wages are higher in a soft equilibrium if and only if $\rho \geq (1-\eta)\, d$. Thus, measured wages are higher in a soft equilibrium when the difference in worker rents between soft and tough equilibria (ρ), the value of favors for workers (d), and the fraction of this value that shows up in measured wages (η), are larger. Similarly, favor exchange also complicates the relationship between the employment regime and "labor demand" (firms' willingness to pay for labor in monetary terms).

In sum, when employment relationships are socially embedded, a full evaluation of any technological or organizational shift must account for the impact of the distribution of employment rents between workers and managers on community interactions. In particular, apparently efficiency-enhancing innovations—such as improved monitoring or reduced restrictions on employment contracts—can undermine community cooperation and ultimately reduce all parties'

ment regimes. In particular, automation can stabilize the soft equilibrium because, by reducing worker rents, it reduces managers' incentives to deviate to intensive monitoring to shift these rents to themselves.

welfare. In the next two sections, we will see that improved alternatives to community interactions and increases in overall productivity can have similar adverse effects on welfare.

4 Opting Out of Community Interactions

We next endogenize community structure in a simple way, by letting individuals opt out of community interactions (starting from the model with favors in the previous section). Here, "opting out" can capture a range of actions that an individual can take to separate herself from the larger community, including residential segregation (as considered in Figure 1) or turning to market-provided alternatives to traditionally community-based services, such as private schooling (as in Figure 2).

Formally, we now assume that at the beginning of each community interaction (even) period, each agent can opt out of the community interaction. If an agent opts out, he or she no longer exerts community effort or receives community benefits, and instead receives an exogenous outside option of γ^W (for a worker) or γ^M (for a manager). Agents who opt out of community interactions continue to participate in employment relations.

The presence of outside alternatives to community interactions can affect equilibrium behavior in one of two ways. First, some agents may opt out of community interactions. Second, even if all agents continue to participate in the community along the equilibrium path, the presence of outside options tightens the incentive constraints that determine community effort, as well as managers' incentive constraints in a soft or tough-but-fair equilibrium. Let us start with the latter case, where the incentive constraints for community effort, (6) and (7), are replaced by:[23]

$$a^W = \max\left\{\delta\frac{1-\beta}{\beta}\Pi^W + \min\left\{B\left(a^W,a^M\right)-\gamma^W, \delta^2\left(B\left(a^W,a^M\right)-\gamma^W\right)\right\},0\right\}, \quad (14)$$

$$a^M = \max\left\{\delta\left(\Pi^M-\Pi_T^M\right) + \min\left\{B\left(a^W,a^M\right)-\gamma^M, \delta^2\left(B\left(a^W,a^M\right)-\gamma^M\right)\right\},0\right\}. \quad (15)$$

For all agents prefer to participate in the community, the largest solution $\left(a^W,a^M\right)$ to (14)–(15) must satisfy

$$a^W \leq \delta\frac{1-\beta}{\beta}\Pi^W + B\left(a^W,a^M\right)-\gamma^W \qquad \text{and} \quad (16)$$

$$a^M \leq \delta\left(\Pi^M-\Pi_T^M\right) + B\left(a^W,a^M\right)-\gamma^M. \quad (17)$$

Note that (16)–(17) always hold when a^W and a^M are both strictly positive, but may be violated when $a^W=0$ or $a^M=0$. In addition, the incentive compatibility constraints for managers to

23. To see this, note that a worker prefers to participate in the community rather than opting out iff $a^M \leq \delta\frac{1-\beta}{\beta}\Pi^W + B\left(a^W,a^M\right)-\gamma^W$, and he prefers to exert effort in the community iff $a^M \leq \delta\frac{1-\beta}{\beta}\Pi^W + \delta^2\left(B\left(a^W,a^M\right)-\gamma^W\right)$, and the highest value of a^M that satisfies both inequalities is given by (14).

provide favors, (8) and (13), are replaced by

$$e + \max\left\{\rho - k - d, \delta^2(\rho - k - d)\right\} \leq \delta\left(V^M\left(a^W, a^M\right) - \gamma^M\right) \qquad \text{and} \qquad (18)$$

$$e - \delta^2 d \leq \delta\left(V^M\left(a^W, a^M\right) - \gamma^M\right). \qquad (19)$$

Equations (14)–(19) characterize equilibria where all agents participate in the community, despite the outside opportunities.

The alternative is the case where (16) or (17) is violated, in which case at least one type of agent will opt out of community interactions. Observe that if only one group (say, managers) opts out in equilibrium, then community effort for the other group (workers) is again given by (14), but now with $a^M = 0$. Additionally, if managers opt out in equilibrium, then the $V^M\left(a^W, a^M\right) - \gamma^M$ term in (18) and (19) drops out, so the necessary and sufficient conditions for the existence of a soft or tough-but-fair equilibrium simplify to

$$e \leq \delta^2(k + d - \rho) \qquad \text{and} \qquad e \leq \delta^2 d.$$

The effects of outside options on community-employment relations are summarized in the next proposition. For the second part of this proposition, we say that outside options become *polarized* in favor of managers, if γ^W decreases by Δ while γ^M increases by $\frac{\beta}{1-\beta}\Delta$, for some $\Delta > 0$, so that managers' outside options improve, while the sum of all agents' outside options remains fixed.

Proposition 6 *1. For each type of equilibrium (soft, tough-but-fair, and tough), increasing either group's outside option reduces all agents' welfare, so long as neither group takes their outside option in equilibrium. In addition, increasing either group's outside option shrinks the parameter range for which a soft or tough-but-fair equilibrium exists.*

2. In a soft or tough-but-fair equilibrium, a polarization of the groups' outside options in favor of managers decreases total welfare whenever $a^W > a^M > 0$ and $B\left(a^W, a^M\right) > \gamma^W$.

Proposition 6.1 is a version of the standard result that improving outside options can reduce trust in relationships.[24] This comparative static can represent societal trends such as improvements in communication technologies that make it easier for the rich to segregate themselves in small enclaves, or improvements in transportation that give the rich access to a wider range of market goods and services. A novel aspect of the current result is that improving outside options can shift the employment regime from soft or tough-but-fair to tough, in addition to

24. Earlier results along these lines were noted by Arnott and Stiglitz (1991), Baker, Gibbons, and Murphy (1994), Kranton (1996), and Ghosh and Ray (1996), among others. The logic is also similar to that of Proposition 2.

reducing payoffs within each type of equilibrium. The intuition is that improving outside options reduces community benefits, which in turn makes it more difficult to dissuade managers from adopting a tough regime.

An implication of Proposition 6.1 is that total welfare is non-monotone in the outside options. For example, starting in a soft equilibrium, increasing γ^M reduces social welfare as described in the proposition, so long as managers remain in the community in equilibrium. When γ^M crosses a threshold, managers start opting out, and total welfare decreases discontinuous. However, a further increase in γ^M raises total welfare, because it benefits managers and has no impact on workers.

Proposition 6.2 establishes that polarizing outside options in favor of the group that exerts more community effort reduces social welfare. This form of polarization can capture societal changes that push both rich and poor individuals to segregate in distinct neighborhoods, where the rich neighborhoods are more desirable. The logic of this result is that, when $B\left(a^W, a^M\right) > \gamma^W$, the direct effect of polarizing outside options in favor of managers is to increase workers' community effort while decreasing managers' community effort by at least as much. Since there are diminishing returns to community effort, when $a^W > a^M$ the net effect of this change is to reduce community benefits.[25]

5 Productivity and Firm Size

In this section, we endogenize firm size. This extension allows a more realistic income distribution, as now each manager can hire many workers. It also lets us analyze how changes in productivity affect firm size and the distribution of rents.

We assume that at the beginning of each period, each manager chooses a number ℓ of workers to match with. Assume that $\ell \in \{0, \ldots, L\}$, where $\frac{1-\beta}{\beta} L < 1$, so that each manager can achieve her desired firm size and there are always some unemployed workers. For simplicity, we additionally assume throughout this section that γ^M is sufficiently high that all managers opt out of community interactions in equilibrium.[26]

The model is otherwise unchanged. A manager's utility in an employment relation is now

$$\begin{aligned} \Pi^M &= \theta g\left(\#\text{workers who work}\right) - \left(\#\text{workers not caught shirking}\right) w \\ &\quad -e\left(\#\text{favors done}\right) - \mathbf{1}\left\{\text{high monitoring}\right\} k\left(\ell\right), \end{aligned}$$

where $\theta > 0$ designates the (Hicks-neutral) productivity of the manager's firm, and g is a

25. This reasoning is symmetric to that of Proposition 5.2, but the comparative static is reversed because Proposition 5.2 is concerned with a shift in equilibrium continuation payoffs, while Proposition 5.2 is focused on a shift in payoffs following a deviation.

26. This simplifying assumption eliminates potentially offsetting effects coming through the impact of productivity on managers' values of community interactions. It also makes the observability of a manager's choice of labor ℓ immaterial. Without it, the analysis would differ depending on whether or not ℓ is observable.

concave production function satisfying $\lim_{\ell\to\infty} g(\ell) = \infty$ and $\lim_{\ell\to\infty} g'(\ell) = 0$. In addition, $e(\ell)$ and $k(\ell)$ now represent, respectively, the cost of carrying out favors for ℓ workers and the cost of intensive monitoring when the manager employs ℓ workers.[27]

We say that there are *economies of scale in favor exchange* if $e(\ell)$ is concave (so the cost of providing favors to ℓ workers increases sublinearly in ℓ), and there are *economies of scale in monitoring* if $k(\ell)$ is concave (so the cost of intensively monitoring ℓ workers increases sublinearly in ℓ). Conversely, there are *diseconomies of scale in favor exchange* if $e(\ell)$ is convex, and there are *diseconomies of scale in monitoring* if $k(\ell)$ is convex.

Proposition 7 *If there are economies of scale in favor exchange and diseconomies of scale in monitoring, then higher productivity favors the existence of a soft equilibrium. Conversely, if there are diseconomies of scale in favor exchange and economies of scale in monitoring, then lower productivity favors the existence of a soft equilibrium.*

A notable implication is that when there are diseconomies of scale in favor exchange and/or economies of scale in monitoring, higher productivity can *reduce* labor demand, in the sense that the wage at a given level of employment declines, because managers increase monitoring.

The welfare implications of Proposition 7 are similar to those in the baseline model:

Proposition 8 *Fix parameters where a soft equilibrium exists.*

1. *If there are economies of scale in favor exchange and diseconomies of scale in monitoring, increasing productivity increases both workers' and managers' welfare in the soft equilibrium.*

2. *If there are diseconomies of scale in favor exchange and economies of scale in monitoring, increasing productivity can reduce both workers' and managers' welfare by destroying the soft equilibrium.*

To appreciate the logic and implications of these result, consider the case with diseconomies of scale in favor exchange and economies of scale in monitoring. When productivity increases, it becomes more profitable for a manager to hire more workers. In turn, when there are diseconomies of scale in favor exchange and economies of scale in monitoring, it is more profitable for a manager who hires many workers to adopt a tough employment regime. Thus, higher productivity tends to make firms tough. Moreover, as in the baseline model, adopting a tough employment regime imposes negative externalities by undermining community effort. So, increasing productivity can ultimately make all agents worse off.

We view diseconomies of scale in favor exchange and economies of scale in monitoring as realistic assumptions. The former assumption captures the idea that it is more difficult to

27. We assume that in each period the manager must use the same monitoring intensity for all workers.

maintain trust and reciprocity in larger organizations. The latter assumption is especially natural when intensive monitoring involves large fixed costs, such as installing surveillance technologies in the workplace, or adopting a new human resource management regime.

While we have emphasized the result that higher productivity can make everyone worse off by undermining community effort, employment-community interactions also present a new channel by which higher productivity can improve welfare. Even in a tough equilibrium, higher producitvity raises labor demand $\ell(\theta)$, which pushes up workers' probability of employment, raising their employment rent $\frac{1-\beta}{\beta}\frac{1-q}{q}c\ell(\theta)$. These higher employment rents then encourage more community effort for workers (and also, indirectly, for managers), which makes everyone better off. This channel from productivity to community effort (working via higher likelihood of employment and greater worker rents) is reminiscent of narratives proposed by Wilson (1996), Putnam (2000) and Murray (2012), among others.

6 Contribution to the Literature

Our paper contributes to a number of distinct social science literatures that focus on the interaction between employment relationships and community structure.

Seminal works on the social embedding of economic interactions include Polanyi (1944) and Granovetter (1985). Our paper combines some high-level insights from this body of work with ideas from the efficiency wage literature, and more broadly from works exploring the role of incentives and organizations (Akerlof 1982; Weisskopf et al. 1983; Shapiro and Stiglitz 1984; Akerlof and Yellen 1986; MacLeod and Malcomson 1989; Levin 2003; Falk 2007). We emphasize two themes that are, to the best of our knowledge, absent from any of these literatures.[28] First, because of their effects on community effort, seemingly beneficial changes, such as improvements in monitoring technologies or better automation or outsourcing opportunities, can have adverse effects on managers as well as workers. Second, developments in the community, such as better-off members segregating or "opting out," may fundamentally change the nature of labor market relations—including wages, organizational forms, and the distribution of income. We believe that these themes are important for understanding the effects of technological and organizational changes on labor market outcomes and community relations, and can be systematically investigated in future empirical work.

28. Acemoglu and Newman (2002) observe that, as in our model, managers have socially excessive incentives to monitor workers in order to shift efficiency wage rents from workers to themselves. They, alongside Gordon (1996), emphasize the role of increased monitoring in the slowdown of US worker wage growth. Acemoglu and Wolitzky (2011) make a related point in a model where employment relations are "coercive", in the sense that workers' employment rents are negative (they are compelled to accept contracts that they would otherwise reject). In Acemoglu and Newman (2002) and the current paper, managers take socially inefficient actions to shift rents away from workers, but these actions are not coercive because they still leave workers with some non-negative rents and consequently their participation constraints are slack. These works do not consider the interaction between employment and community relations either.

We also build on the literature exploring game-theoretic cooperation in communities (following Kandori (1992)), and the question of whether market-based and community-based interactions are substitutes (Arnott and Stiglitz 1991; Baker, Gibbons, and Murphy 1994; Kranton 1996; Dixit 2003; Greif and Tabellini 2017; Gagnon and Goyal 2017) or complements (Bernheim and Whinston 1990; Acemoglu and Wolitzky 2020; Balmaceda 2023; Jackson and Xing 2021). A key theme of the "substitutes" papers is that, since markets often serve as outside options for community relations, improved market efficiency can reduce welfare by undermining trust within communities. A central emphasis of the "complements" papers is that information can flow between markets and communities, and consequently the threat of losing rents in each type of relationship can motivate cooperation in the other. Our paper builds on ideas from both strands. On the one hand, rents in each type of relationship support cooperation in the other, as in the complements papers. On the other hand, we show that apparently efficiency-enhancing changes in employment relations—such as improved monitoring or a reduction in worker effort costs—can trigger a breakdown of cooperation in the community, because they change the distribution of rents in employment, which are critical for supporting community effort. Hence, in our model employment and community interactions are complements, but are "substitutes at the margin"—in the sense that efficiency gains in employment can undermine communities by reducing worker rents.

Another relevant literature focuses on various aspects of residential segregation and neighborhood relations. Theoretical work in this area includes, among others, Benabou (1993, 1996), Durlauf (1994), Fernández and Rogerson (2001), and Fogli and Guerrieri (2019), while the even larger empirical literature includes contributions such as Borjas (1992), Topa (2001), and Chetty et al. (2014). Although this literature emphasizes the inequality and social mobility consequences of residential segregation, it does not link employment and community relations. Our paper contributes by highlighting novel interactions between the labor market and community relations and by making new empirical predictions, centered on the role of labor market rents and organizational form in shaping community relations and social outcomes. These predictions are ripe for future empirical work.

Finally, we relate to works linking recent economic trends (e.g., in worker wages or inequality) and social trends (e.g., in civic participation or deaths of despair) in the United States. Well-known works in this general area include Wilson (1996), Fukuyama (1996), Putnam (2000), Black, McKinnish, and Sanders (2005), Murray (2012), Rajan (2019), Autor, Dorn, and Hanson (2019), and Case and Deaton (2020). Many of these studies emphasize the effects of declining economic opportunities on social outcomes. We contribute to this literature by providing a model of the co-determination of employment regimes, economic outcomes and effort in providing community-level benefits; by analyzing how community relations influence organizational choices and labor market outcomes; and by developing a specific mechanism for the effect of employment opportunities on the community—namely, employment rents generating incentives

for community effort. These new implications provide new directions for empirical work.[29]

7 Conclusion

Both work and community life in the United States have undergone transformative changes over the past several decades. These developments appear to be correlated across space and time: those local areas experiencing lower income for workers and greater increases in inequality between managers and workers are also the ones undergoing greater residential segregation, withdrawal of richer residents from the community (for example, by opting out of public schooling), broader declines in civic activity, and more monitoring and less cooperative relations between workers and managers in workplaces.

This paper develops the hypothesis that these transformations are intimately linked and builds a theoretical framework to elucidate these community-employment relationships. Inspired by evidence from case studies and the literature emphasizing the importance of work for community behavior (e.g., Wilson, 1996; Murray, 2012; Case and Deaton, 2020), we argue that cooperation in the community depends in part on how much "rent " (payoffs above outside options) workers receive from employment, as well as the profits that managers and business owners make. We emphasize that not only can workers' ability to obtain high-rent jobs be linked to their standing in the community (as in the literature on community-based job recommendations following Granovetter, 1973, 1985, Montgomery, 1991, Topa, 2001, and Calvo-Armengol and Jackson, 2004), but community cooperation can also encourage managers to adopt more worker-friendly practices, due to the threat of being excluded from the community if they adopt harsher policies.

These linkages imply that different types of community-employment equilibria are possible. In a "soft equilibrium", employment relations involve high wages, low worker monitoring, and favor exchange between workers and managers. In a "tough equilibrium" wages are lower, monitoring is higher, and there is no favor exchange. We find that the soft equilibrium can Pareto dominate the tough equilibrium, even when the tough equilibrium yields higher profits for managers, because the soft equilibrium can support higher levels of community cooperation by providing greater employment rents for workers.

This observation drives our main comparative static results: a range of technological and social opportunities that would, all else equal, make either some or all agents better off, can destabilize the soft management regime and shift the economy to a Pareto inferior equilib-

29. For example, many variables found to be correlated with social mobility, local education, health, and various socioeconomic outcomes in these literatures may be proxying for labor market rents and how binding the outside options of different demographic groups are. Therefore, our results push for empirical models where the causal effects of these variables are carefully controlled. They also suggest new empirical tests, for example exploring whether exogenous declines in wages in an area—holding constant other aspects of the labor market such as the employment rate—reduce community effort and worsen social outcomes.

rium. Improved monitoring technologies; new opportunities for automation, outsourcing, and offshoring; declines in minimum wages; the availability of new residential neighborhoods for well-off citizens; and even more efficient production technologies can all cause the soft equilibrium to unravel. In each case, the logic is that these technological or social developments raise managers' profits in isolation, but additionally encourage them to increase monitoring, renege on workplace favor exchange, or reduce their community involvement. More generally, we stress that, because employment relations are embedded in communities, major technological or demand shifts can have important indirect effects on wages, employment, productivity, and the income distribution via their impact on community relations; and, conversely, social trends that transform community relations also influence labor market dynamics.

While our main contribution is theoretical, we believe that our framework is relevant for understanding some major economic and social changes that have occurred in the United States and other industrialized nations over the last half century. We see several exciting areas for further empirical and theoretical research along these lines. First, more can be done to explore whether our distinction between soft and tough management provides a useful lens for interpreting different types of management-worker relations across companies, and whether the predicted synergy between soft management and more cooperative community relations exists and can be quantified.

Second, it would be particularly interesting to study more rigorously whether recent economic and social trends in the United States and other countries can be partially explained by shifts from soft socioeconomic equilibria to tough ones.

Third, it is important to investigate the extent to which there is a causal relationship between the disappearance of attractive employment opportunities for workers and the retrenchment of civic life in local communities, and whether this causal effect works through the mechanisms highlighted by our framework. The evidence presented in, among others, Wilson (1996), Black, McKinnish, and Sanders (2005), and Autor, Dorn, and Hanson (2019) suggests that this is plausible, but the exact causal mechanisms are yet to be studied.

Finally, our theoretical framework is amendable to various extensions, including introducing additional linkages between employment and community interactions (e.g., making workers' workplace behavior observable to the community); modelling residential choice and community interactions in multiple neighborhoods (which would endogenize managers' payoffs when they withdraw from mixed communities); modelling technological changes such as automation in greater detail; explicitly modelling communication (e.g., job recommendations) within communities; and introducing additional dimensions of heterogeneity, such as ethnic diversity or social network structure within communities. These and other directions may lead to a deeper understanding of the interplay of employment and community interactions and their implications for contemporary socioeconomic trends.

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Appendix: Omitted Proofs

Proof of Lemma 1

For the first claim, substituting for $B\left(a^W, a^M\right)$, we can rewrite (6) and (7) as

$$\begin{aligned} a^W &= \delta\frac{1-\beta}{\beta}\Pi^W + \delta^2\left(\beta\alpha b\left(a^W\right) + (1-\beta)\,\alpha b\left(a^M\right)\right), \\ a^M &= \max\left\{\delta\left(\Pi^M - \Pi_T^M\right) + \delta^2\left(\beta\alpha b\left(a^W\right) + (1-\beta)\,\alpha b\left(a^M\right)\right), 0\right\}. \end{aligned}$$

Thus, $\left(a^W, a^M\right)$ is a fixed point of the function $F : \mathbb{R}_+^2 \to \mathbb{R}_+^2$ given by

$$F\left(\tilde{a}^W, \tilde{a}^M\right) = \begin{pmatrix} \delta\frac{1-\beta}{\beta}\Pi^W + \delta^2\left(\beta\alpha b\left(\tilde{a}^W\right) + (1-\beta)\,\alpha b\left(\tilde{a}^M\right)\right), \\ \max\left\{\delta\left(\Pi^M - \Pi_T^M\right) + \delta^2\left(\beta\alpha b\left(\tilde{a}^W\right) + (1-\beta)\,\alpha b\left(\tilde{a}^M\right)\right), 0\right\} \end{pmatrix}.$$

This function is increasing in $\left(\tilde{a}^W, \tilde{a}^M\right)$, as b is increasing. Moreover, by the Inada condition $\lim_{a\to\infty} b'(a) = 0$, there exists $\bar{a} > 0$ such that if $\left(\tilde{a}^W, \tilde{a}^M\right)$ satisfies $\max\left\{\tilde{a}^W, \tilde{a}^M\right\} > \bar{a}$, then $\max\left\{F_1\left(\tilde{a}^W, \tilde{a}^M\right), F_2\left(\tilde{a}^W, \tilde{a}^M\right)\right\} < \max\left\{\tilde{a}^W, \tilde{a}^M\right\}$. Hence, any fixed point of F must lie in $[0, \bar{a}]^2$, and by Tarski's fixed point theorem, the set of fixed points of F on $[0, \bar{a}]^2$ forms a complete lattice. Hence, the largest fixed point of F satisfies the conditions of the lemma.

For the second and third claims, note that the function F is continuous and increasing in $\left(\tilde{a}^W, \tilde{a}^M\right)$ and $\left(\Pi^W, \Pi^M - \Pi_T^M, \delta\right)$. Hence, its largest fixed point is increasing in $\left(\Pi^W, \Pi^M - \Pi_T^M, \delta\right)$, by Theorem 1 of Milgrom and Roberts (1994). Moreover, the first component of F is strictly increasing in $\tilde{a}^W$, $\tilde{a}^M$, Π^W, and δ; and when $\tilde{a}^W > 0$ the second component of F is strictly increasing in $\tilde{a}^W$, $\tilde{a}^M$, $\Pi^M - \Pi_T^M$, and δ. This implies that the first component of the largest fixed point cannot remain constant when Π^W or δ increases, or when $a^M > 0$ and $\Pi^M - \Pi_T^M$ increases; and that the second component of the largest fixed point cannot remain constant at a strictly positive value when Π^W, $\Pi^M - \Pi_T^M$, or δ increases.

For the fourth claim, note that $\left(a^W, a^M\right) \to 0$ as $\delta \to 0$. By the Inada condition $\lim_{a\to 0} b'(a) = \infty$,

$$\begin{aligned} \frac{d}{da^W}\left(B\left(a^W, a^M\right) - a^W\right) &= \beta\alpha b'\left(a^W\right) - 1, \\ \frac{d}{da^M}\left(B\left(a^W, a^M\right) - a^W\right) &= \beta\alpha b'\left(a^M\right), \\ \frac{d}{da^W}\left(B\left(a^W, a^M\right) - a^W\right) &= (1-\beta)\,\alpha b'\left(a^M\right), \qquad \text{and} \\ \frac{d}{da^M}\left(B\left(a^W, a^M\right) - a^M\right) &= (1-\beta)\,\alpha b'\left(a^M\right) - 1 \end{aligned}$$

are all strictly positive for sufficiently small a^W and a^M. Hence, for sufficiently small δ, $V^W\left(a^W, a^M\right)$ and $V^M\left(a^W, a^M\right)$ are both strictly increasing in a^W and a^M. The claim fol-

lows since all incentive compatible pairs $\left(\tilde{a}^W, \tilde{a}^M\right)$ satisfy $\tilde{a}^W \leq a^W$ and $\tilde{a}^M \leq a^M$, where $\left(a^W, a^M\right)$ is the pair defined in part 1.

As observed in the text, the fifth claim follows because $a^W > \delta^2 B\left(a^W, a^M\right) \geq a^M$.

Proof of Proposition 1

The first two parts of the proposition are proved in the text. For the third part, let $\beta = .5$, $y = 1$, $c = .1$, $p = .6$, $q = .9$, $k = .05$, $\delta = .4$, and $b(a) = \sqrt{a}$ for all a. Then $\rho = 1/18$, $\Pi_S^W = 1/15$, $\Pi_S^M = 5/6$, $\Pi_T^W = 1/90$, and $\Pi_T^M = 151/180$. Thus, $\left(a_S^W, a_S^M\right)$ is the greatest solution to

$$\begin{aligned} a_S^W &= (.4)\,\Pi_S^W + (.4)^2\left(.5\sqrt{a_S^W} + .5\sqrt{a_S^M}\right), \\ a_S^M &= (.4)\left(\Pi_S^M - \Pi_T^M\right) + (.4)^2\left(.5\sqrt{a_S^W} + .5\sqrt{a_S^M}\right), \end{aligned}$$

which is given by $\left(a_S^W \approx .06061, a_S^M \approx .03172\right)$; and $\left(a_T^W, a_T^M\right)$ is the greatest solution to

$$\begin{aligned} a_T^W &= (.4)\,\Pi_T^W + (.4)^2\left(.5\sqrt{a_S^W} + .5\sqrt{a_S^M}\right), \\ a_T^M &= (.4)\,(0) + (.4)^2\left(.5\sqrt{a_S^W} + .5\sqrt{a_S^M}\right), \end{aligned}$$

which is given by $\left(a_T^W \approx .03207, a_T^M \approx .02762\right)$. Note that these effort levels are all below the first-best level for each group, which is given by $a^* = 1/16 = 0.062\,5$, so $\delta < \bar{\delta}$. We thus have

$$\begin{aligned} V_S^W &= .5\sqrt{a_S^W} + .5\sqrt{a_S^M} - a_S^W \approx .1515, \qquad V_S^M = .5\sqrt{a_S^W} + .5\sqrt{a_S^M} - a_S^M \approx .1804, \\ V_T^W &= .5\sqrt{a_T^W} + .5\sqrt{a_T^M} - a_T^W \approx .1406, \qquad V_T^M = .5\sqrt{a_T^W} + .5\sqrt{a_T^M} - a_T^M \approx .1450. \end{aligned}$$

Therefore, the soft equilibrium exists, since $\Pi_T^M - \Pi_S^M \approx 0.005556 \leq .07217 \approx (.4)\,V_S^M$. This soft equilibrium Pareto dominates the tough equilibrium, because

$$\begin{aligned} \frac{1}{1+.4}\Pi_T^W + \frac{.4}{1+.4}V_T^W &\approx .04810 < .09092 \approx \frac{1}{1+.4}\Pi_S^W + \frac{.4}{1+.4}V_S^W, \\ \frac{1}{1+.4}\Pi_T^M + \frac{.4}{1+.4}V_T^M &\approx .6406 < .6468 \approx \frac{1}{1+.4}\Pi_S^M + \frac{.4}{1+.4}V_S^M. \end{aligned}$$

Proof of Proposition 2

Proposition 2 follows as the special case where $d = e = 0$ of the corresponding result in Proposition 3.

Proof of Proposition 3

The first part of the proposition is proved in the text.

For the second part, first consider a soft equilibrium. Substituting for Π_S^W, Π_S^M, and Π_T^M, we see that a^W and a^M are given by the greatest fixed point of

$$F\left(\tilde{a}^W, \tilde{a}^M\right) = \begin{pmatrix} \delta \frac{1-\beta}{\beta} \frac{1-p}{p} c + \alpha\delta^2 B\left(\tilde{a}^W, \tilde{a}^M\right), \\ \max\left\{\delta\left(d - e + k - \frac{q-p}{pq}c\right) + \alpha\delta^2 B\left(\tilde{a}^W, \tilde{a}^M\right), 0\right\} \end{pmatrix}.$$

Note that each component of F is increasing in $\tilde{a}^W$, $\tilde{a}^M$, δ, α, k, and d, and decreasing in q and e. (The only non-obvious part of this observation is that the second component is increasing in δ, but this holds because the derivative of $\delta\left(d - e + k - \frac{q-p}{pq}c\right) + \alpha\delta^2 B\left(\tilde{a}^W, \tilde{a}^M\right)$ with respect to δ is $d - e + k - \frac{q-p}{pq}c + 2\alpha\delta B\left(\tilde{a}^W, \tilde{a}^M\right)$, which is positive whenever $\delta\left(d - e + k - \frac{q-p}{pq}c\right) + \alpha\delta^2 B\left(\tilde{a}^W, \tilde{a}^M\right)$ is.) Hence, by Theorem 1 of Milgrom and Roberts (1994), a^W and a^M are both increasing in δ, α, k, and d, and decreasing in q and e. Next, since $V^M\left(a^W, a^M\right)$ is increasing in a^W and a^M (as $\delta < \bar{\delta}$), it is increasing in δ, α, k, and d, and decreasing in q and e. Thus, since (8) is easier to satisfy when V^M, δ, k, or d increases, or q or e decreases, we see that (taking into account both the effect on V^M and the direct effect on (8) for a fixed V^M) (8) is easier to satisfy when δ, α, k, or d increases, or q or e decreases. In addition, the validity of (8) does not depend on y. Since a soft equilibrium exists if and only if (8) holds, this establishes the existence comparative statics for these parameters. In addition, the result for a simultaneous increase in p and c that keeps $\frac{1-p}{p}c$ constant follows because such a change decreases $\frac{q-p}{pq}c = \frac{q-p}{q(1-p)}\frac{1-p}{p}c$, and thus has the same effect on the existence of a soft equilibrium as a decrease in q. Moreover, an increase in α, k, or d, or a decrease in q or e, all weakly increase Π_S^W and Π_S^M as well as V_S^W and V_S^M, and hence increase all agents' welfare in a soft equilibrium.

Now consider a tough-but-fair equilibrium. Substituting for Π_{TF}^W, Π_{TF}^M, and Π_T^M, we see that a^W and a^M are given by the greatest fixed point of

$$F\left(\tilde{a}^W, \tilde{a}^M\right) = \begin{pmatrix} \delta \frac{1-\beta}{\beta} \frac{1-q}{q} c + \alpha\delta^2 B\left(\tilde{a}^W, \tilde{a}^M\right), \\ \delta\left(d - e\right) + \alpha\delta^2 B\left(\tilde{a}^W, \tilde{a}^M\right) \end{pmatrix}.$$

Note that each component of F is increasing in $\tilde{a}^W$, $\tilde{a}^M$, δ, α, c, and d, and decreasing in q and e. Therefore, a^W and a^M (and hence V^M) are increasing in δ, α, c, and d, and decreasing in q and e. Thus, since (13) is easier to satisfy when V^M, δ, or d increases, or e decreases, we see that (13) is easier to satisfy when δ, α, c, or d increases, or q or e decreases. In addition, the validity of (13) does not depend on y, k, or p. Since a soft equilibrium exists if and only if (13) holds, this establishes the existence comparative statics. Moreover, an increase in α or d, or a decrease in q or e, all weakly increase Π_S^W and Π_S^M as well as V_S^W and V_S^M, and hence increase all agents' welfare in a soft equilibrium.

A0.1 Proof of Proposition 4

Since Proposition 4 asserts a possibility result, it suffices to construct explicit examples.

For Proposition 4.1, suppose that $\beta = .5$, $y = 1$, $c = .22$, $p = .83$, $q = .9$, $k = .02$, $d = .12$, $e = .09$, $\alpha = 1$, $b(a) = \sqrt{a}$, and $\delta = .4$. Then $\rho \approx .02062$, $\Pi_S^W \approx .04506$, $\Pi_S^M \approx .7649$, $\Pi_T^W = \Pi_{TF}^W \approx .02444$, $\Pi_T^M \approx .7356$, and $\Pi_{TF}^M \approx .7656$. Next, $\left(a_S^W, a_S^M\right)$ is the greatest solution to

$$a_S^W = (.4)\,\Pi_S^W + (.4)^2\left(.5\sqrt{a_S^W} + .5\sqrt{a_S^M}\right) \text{ and } a_S^M = (.4)\left(\Pi_S^M - \Pi_T^M\right) + (.4)^2\left(.5\sqrt{a_S^W} + .5\sqrt{a_S^M}\right),$$

which is given by $\left(a_S^W \approx .05414, a_S^M \approx .04787\right)$. Moreover, $\left(a_T^W, a_T^M\right)$ is the greatest solution to

$$a_T^W = (.4)\,\Pi_T^W + (.4)^2\left(.5\sqrt{a_T^W} + .5\sqrt{a_T^M}\right) \text{ and } a_T^M = (.4)\,(0) + (.4)^2\left(.5\sqrt{a_T^W} + .5\sqrt{a_T^M}\right),$$

which is given by $\left(a_T^W \approx .03945, a_T^M \approx .02967\right)$. Finally, $\left(a_{TF}^W, a_{TF}^M\right)$ is the greatest solution to

$$a_{TF}^W = (.4)\,\Pi_{TF}^W + (.4)^2\left(.5\sqrt{a_{TF}^W} + .5\sqrt{a_{TF}^M}\right) \text{ and } a_{TF}^M = (.4)\left(\Pi_{TF}^M - \Pi_T^M\right) + (.4)^2\left(.5\sqrt{a_{TF}^W} + .5\sqrt{a_{TF}^M}\right),$$

which is given by $\left(a_{TF}^W \approx .04361, a_{TF}^M \approx .04584\right)$. We thus have

$$\begin{aligned}
V_S^W &= .5\sqrt{a_S^W} + .5\sqrt{a_S^M} - a_S^W \approx .1716,\ V_S^M = .5\sqrt{a_S^W} + .5\sqrt{a_S^M} - a_S^M \approx .1779,\\
V_T^W &= .5\sqrt{a_T^W} + .5\sqrt{a_T^M} - a_T^W \approx .1460,\ V_T^M = .5\sqrt{a_T^W} + .5\sqrt{a_T^M} - a_T^M \approx .1558,\\
V_{TF}^W &= .5\sqrt{a_{TF}^W} + .5\sqrt{a_{TF}^M} - a_{TF}^W \approx .1679,\ V_{TF}^M = .5\sqrt{a_{TF}^W} + .5\sqrt{a_{TF}^M} - a_{TF}^M \approx .1656.
\end{aligned}$$

Hence, the soft equilibrium exists, as

$$\begin{aligned}
e + \max\left\{\rho - k - d, \delta^2(\rho - k - d)\right\} &\approx .09 + \max\left\{.02062 - .02 - .12, .4^2(.02062 - .02 - .12)\right\}\\
&\approx .07090 < .07116 \approx (.4)\,V_S^M.
\end{aligned}$$

However, the tough-but-fair equilibrium does not exist, since

$$e - \delta^2 d = .09 - .4^2(.12) = .0708 > .06625 \approx \delta V_{TF}^M;$$

and managers' soft and tough equilibrium payoffs are

$$\frac{1}{1+.4}\Pi_S^M + \frac{.4}{1+.4}V_S^M \approx .5972 \text{ and } \frac{1}{1+.4}\Pi_T^M + \frac{.4}{1+.4}V_T^M \approx .5699.$$

Now suppose that q increases to $\hat{q} = .99$. Then Π_T^W decreases to $\approx .002222$ and Π_T^M

increases to $\approx .7578$ (while Π_S^W and Π_S^M remains constant), so $\left(a_S^W, a_S^M\right)$ is now given by $\left(a_S^W \approx .05138, a_S^M = .03620\right)$, and $\left(a_T^W, a_T^M\right)$ is now given by $\left(a_T^W \approx .02692, a_T^M = .02604\right)$. We thus have

$$\begin{aligned} V_S^W &= .5\sqrt{a_S^W} + .5\sqrt{a_S^M} - a_S^W \approx .1571,\ V_S^M = .5\sqrt{a_S^W} + .5\sqrt{a_S^M} - a_S^M \approx .1723, \\ V_T^W &= .5\sqrt{a_T^W} + .5\sqrt{a_T^M} - a_T^W \approx .1358,\ V_T^M = .5\sqrt{a_T^W} + .5\sqrt{a_T^M} - a_T^M \approx .1367. \end{aligned}$$

Hence, the soft equilibrium does not exist, since in this case $e + \delta^2(\rho - k - d) \approx .07445 > .06892 \approx \delta V_S^M$, and managers' tough equilibrium payoff is $\frac{1}{1+.4}\Pi_T^M + \frac{.4}{1+.4}V_T^M \approx .5858$. Therefore, managers are better-off in the soft equilibrium with intensive monitoring precision q than in the the tough equilibrium with monitoring cost $\hat{q}$. Moreover, the same is clearly true for workers, as both their employment and community payoffs are higher in the soft equilibrium.

Now consider the original value for q (i.e., $q = .9$), but suppose that k decreases to $\hat{k} = .01$. Then Π_T^M increases to $\approx .7456$ (while Π_S^W, Π_S^M, and Π_T^W remains constant), so $\left(a_S^W, a_S^M\right)$ is now given by $\left(a_S^W \approx .05297, a_S^M = .04270\right)$; while $\left(a_T^W, a_T^M\right)$ are unchanged from their original values of $\left(a_T^W \approx .03945, a_T^M \approx .02967\right)$. We thus have

$$V_S^W = .5\sqrt{a_S^W} + .5\sqrt{a_S^M} - a_S^W \approx .1654 \text{ and } V_S^M = .5\sqrt{a_S^W} + .5\sqrt{a_S^M} - a_S^M \approx .1757.$$

Hence, the soft equilibrium does not exist, because $e + \delta^2\left(\rho - \hat{k} - d\right) \approx .07250 > .07028 \approx \delta V_S^M$, and managers' tough equilibrium payoff is $\frac{1}{1+.4}\Pi_T^M + \frac{.4}{1+.4}V_T^M \approx .5770$. Thus, managers are better-off in the soft equilibrium with monitoring cost k than in the the tough equilibrium with monitoring cost $\hat{k}$, and the same is clearly true for workers. This completes the proof of Proposition 4.1.

Next, for Proposition 4.2, suppose that $\beta = .607$, $y = 1$, $c = .285$, $p = .252$, $q = .802$, $k = .42$, $d = .409$, $e = .248$, $\alpha = 13.199$, $b(a) = a^{.679}$, and $\delta = .119$. Then $\rho \approx .7756$, $\Pi_S^W \approx .8460$, $\Pi_S^M \approx .03005$, $\Pi_T^W = \Pi_{TF}^W \approx .07036$, $\Pi_T^M \approx .2246$, and $\Pi_{TF}^M \approx .3856$. Next, $\left(a_S^W, a_S^M\right)$ is given by $\left(a_S^W \approx 0.087, a_S^M \approx 0\right)$; $\left(a_T^W, a_T^M\right)$ is given by $\left(a_T^W \approx 0.0152, a_T^M \approx 0.0098\right)$; and $\left(a_{TF}^W, a_{TF}^M\right)$ is given by $\left(a_{TF}^W \approx 0.0213, a_{TF}^M \approx 0.0350\right)$. We thus have

$$V_S^W \approx 1.437,\ V_S^M \approx 1.523,\ V_T^W \approx 0.676,\ V_T^M \approx 0.682,\ V_{TF}^W \approx 1.098, \text{ and } V_{TF}^M \approx 1.084.$$

Hence, the soft equilibrium does not exist, as $e + \delta^2(\rho - k - d) \approx 0.2472 > 0.1813 \approx \delta V_S^M$. Moreover, the tough-but-fair equilibrium also does not exist, since $e - \delta^2 d = 0.2422 > 0.1290 \approx \delta V_{TF}^M$. Managers' tough equilibrium payoff is $\frac{1}{1+\delta}\Pi_T^M + \frac{\delta}{1+\delta}V_T^M \approx 0.2732$.

Now consider introducing a minimum wage of $\underline{w} = .72195$ (which equals the soft equilibrium wage, $c/p - d$). Then Π_T^W increases to .4370 and Π_T^M decreases to -.1420 (while Π_S^W and Π_S^M remain constant), so now, $\left(a_S^W, a_S^M\right)$ is given by $\left(a_S^W \approx 0.0989, a_S^M \approx 0.0541\right)$, and $V_S^W \approx 2.2831$

and $V_S^M \approx 2.3278$. Hence, the soft equilibrium now exists, as $e + \delta^2(\rho - k - d) \approx 0.247 < 0.2770 \approx \delta V_S^M$. Moreover, managers' payoff in the soft equilibrium is $\frac{1}{1+\delta}\Pi_S^M + \frac{\delta}{1+\delta}V_S^M \approx 0.2743$. Consequently, managers are better-off in the soft equilibrium with minimum wage $\underline{w}$ than in the the tough equilibrium without a minimum wage, and the same is clearly true for workers. This completes the proof of Proposition 4.2.

Proof of Proposition 5

Suppose that automation, outsourcing, or offshoring decreases c, while possibly also increasing or decreasing y. In a soft or tough-but-fair equilibrium, if $\Pi^M - \Pi_T^M \geq \frac{1-\beta}{\beta}\Pi^W$ (which implies that $a^M > a^W$) then community benefits and worker welfare both decrease.

Fix a soft or tough-but-fair equilibrium. Recall that

$$a^W = \delta\frac{1-\beta}{\beta}\Pi^W + \delta^2 B\left(a^W, a^M\right).$$

Hence, total worker welfare can be written as

$$\begin{aligned}
& \frac{1}{1+\delta}\Pi^W + \frac{\delta}{1+\delta}\left(B\left(a^W, a^M\right) - a^W\right) \\
= \; & \frac{1}{1+\delta}\Pi^W + \frac{\delta}{1+\delta}\left(B\left(a^W, a^M\right) - \delta\frac{1-\beta}{\beta}\Pi^W - \delta^2 B\left(a^W, a^M\right)\right) \\
= \; & \frac{1}{1+\delta}\left(1 - \delta^2\frac{1-\beta}{\beta}\right)\Pi^W + \frac{\delta}{1+\delta}\left(1-\delta^2\right)B\left(a^W, a^M\right).
\end{aligned}$$

Since $\beta > 1/2$, we have expressed worker welfare as an increasing function of Π^W and $B\left(a^W, a^M\right)$. Thus, since Π^W is increasing in c and independent of y, it suffices to show that $B\left(a^W, a^M\right)$ is increasing in c and independent of y.

To see this, let

$$F\left(a^W, a^M\right) = \begin{pmatrix} \delta\frac{1-\beta}{\beta}\Pi^W + \delta^2 B\left(a^W, a^M\right), \\ \delta\left(\Pi^M - \Pi_T^M\right) + \delta^2 B\left(a^W, a^M\right) \end{pmatrix}.$$

Note that the maximum incentive compatible community effort levels are given by the greatest fixed point of F, because $\Pi^W \geq 0$ and $\Pi^M - \Pi_T^M \geq \frac{1-\beta}{\beta}\Pi^W$ imply that $\Pi^M - \Pi_T^M \geq 0$. In a tough-but-fair equilibrium, we have

$$F\left(a^W, a^M\right) = \begin{pmatrix} \delta\frac{1-\beta}{\beta}\frac{1-q}{q}c + \delta^2 B\left(a^W, a^M\right), \\ \delta(d-e) + \delta^2 B\left(a^W, a^M\right) \end{pmatrix}.$$

Since F is monotone in a^W, a^M, and c, Theorem 1 of Milgrom and Roberts (1994) implies that the greatest fixed point of F is increasing in c, which completes the proof for a tough-but-fair

equilibrium.

The argument for a soft equilibrium is more complicated. In a soft equilibrium, we have

$$F\left(a^W, a^M\right) = \begin{pmatrix} \delta\frac{1-\beta}{\beta}\frac{1-p}{p}c + \delta^2 B\left(a^W, a^M\right), \\ \delta\left(-\frac{q-p}{pq}c + k + d - e\right) + \delta^2 B\left(a^W, a^M\right) \end{pmatrix}.$$

Note that $\frac{q-p}{pq} < \frac{1-p}{p}$. Thus, an increase in c that increases $\frac{q-p}{pq}c$ by Δ increases $\frac{1-p}{p}c$ by more than Δ. It thus suffices to show that, when $-(\tau+\Delta) \geq \frac{1-\beta}{\beta}\left(\frac{1-p}{p}c + \Delta\right)$, we have $B\left(\bar{a}^W, \bar{a}^M\right) \leq B\left(\hat{a}^W, \hat{a}^M\right)$, where $\left(\bar{a}^W, \bar{a}^M\right)$ and $\left(\hat{a}^W, \hat{a}^M\right)$ are, respectively, the greatest fixed points of

$$\begin{aligned} F\left(a^W, a^M\right) &= \begin{pmatrix} \delta\frac{1-\beta}{\beta}\frac{1-p}{p}c + \delta^2 B\left(a^W, a^M\right), \\ -\delta\tau + \delta^2 B\left(a^W, a^M\right) \end{pmatrix} \qquad \text{and} \\ \hat{F}\left(a^W, a^M\right) &= \begin{pmatrix} \delta\frac{1-\beta}{\beta}\left(\frac{1-p}{p}c + \Delta\right) + \delta^2 B\left(a^W, a^M\right), \\ -\delta(\tau+\Delta) + \delta^2 B\left(a^W, a^M\right) \end{pmatrix}. \end{aligned}$$

To see this, note that since F and $\hat{F}$ are monotone and continuous, there exists $\bar{a} > 0$ such that $\left(\bar{a}^W, \bar{a}^M\right) = \lim_{n\to\infty} F^n(\bar{a}, \bar{a})$ and $\left(\hat{a}^W, \hat{a}^M\right) = \lim_{n\to\infty} \hat{F}^n(\bar{a}, \bar{a})$, where $F^n(\cdot,\cdot)$ and $\hat{F}^n(\cdot,\cdot)$ denote the n-fold iterations of $F(\cdot,\cdot)$ and $\hat{F}(\cdot,\cdot)$, respectively. (This follows by defining $\bar{a} > 0$ as in the proof of Lemma 1.1 and applying the argument of Theorem 5 of Milgrom and Roberts, 1990.) For each $n \geq 1$, let $\left(a_n^W, a_n^M\right) = F^n(\bar{a}, \bar{a})$ and let $\left(\hat{a}_n^W, \hat{a}_n^M\right) = \hat{F}^n(\bar{a}, \bar{a})$. We will prove that, for each $n \geq 1$,

$$B\left(a_n^W, a_n^M\right) \leq B\left(\hat{a}_n^W, \hat{a}_n^M\right) \qquad \text{and} \tag{A1}$$

$$B\left(a_{n-1}^W, a_{n-1}^M\right) - \beta a_n^W - (1-\beta)a_n^M \leq B\left(\hat{a}_{n-1}^W, \hat{a}_{n-1}^M\right) - \beta\hat{a}_n^W - (1-\beta)\hat{a}_n^M. \tag{A2}$$

Since (A1) is preserved in the limit, this yields $B\left(\bar{a}^W, \bar{a}^M\right) \leq B\left(\hat{a}^W, \hat{a}^M\right)$, completing the proof.

It thus remains to establish (A1) and (A2). We argue by induction on n. For $n = 1$, let $B_0 = b(\bar{a})$. We have

$$\begin{aligned} a_1^W &= \delta\frac{1-\beta}{\beta}\frac{1-p}{p}c + \delta^2 B_0, \qquad a_1^M = -\delta\tau + \delta^2 B_0, \\ \hat{a}_1^W &= \delta\frac{1-\beta}{\beta}\left(\frac{1-p}{p}c + \Delta\right) + \delta^2 B_0, \qquad \text{and} \qquad \hat{a}_1^M = -\delta(\tau+\Delta) + \delta^2 B_0. \end{aligned}$$

Note that

$$\begin{aligned}
& B\left(\hat{a}_1^W, \hat{a}_1^M\right) - B\left(a_1^W, a_1^M\right) \\
= \;& \beta\alpha b\left(\hat{a}_1^W\right) + (1-\beta)\,\alpha b\left(\hat{a}_1^M\right) - \left(\beta\alpha b\left(a_1^W\right) + (1-\beta)\,\alpha b\left(a_1^M\right)\right) \\
= \;& \int_{s=0}^{\Delta} \frac{\partial}{\partial s}\left(\beta\alpha b\left(\delta\frac{1-\beta}{\beta}\left(\frac{1-p}{p}c+s\right)+\delta^2 B_0\right) + (1-\beta)\,\alpha b\left(-\delta\left(\tau+s\right)+\delta^2 B_0\right)\right) ds \\
= \;& \delta\left(1-\beta\right)\int_{s=0}^{\Delta}\left(\alpha b'\left(\delta\frac{1-\beta}{\beta}\left(\frac{1-p}{p}c+s\right)+\delta^2 B_0\right) - \alpha b'\left(-\delta\left(\tau+s\right)+\delta^2 B_0\right)\right) ds \\
\geq \;& 0,
\end{aligned}$$

where the inequality follows because b is concave and $\frac{1-\beta}{\beta}\left(\frac{1-p}{p}c+s\right) \leq -\left(\tau+s\right)$ for all $s \in [0,\Delta]$, by the hypothesis that $\frac{1-\beta}{\beta}\left(\frac{1-p}{p}c+\Delta\right) \leq -\left(\tau+\Delta\right)$. Hence, (A1) holds for $n=1$. Moreover, (A2) holds for $n=1$, as

$$\begin{aligned}
B\left(a_0^W, a_0^M\right) - \beta a_1^W - (1-\beta)\,a_1^M &= B_0 - \beta a_1^W - (1-\beta)\,a_1^M \\
&= B_0 - \beta\left(\hat{a}_1^W - \delta\frac{1-\beta}{\beta}\Delta\right) - (1-\beta)\left(\hat{a}_1^M + \delta\Delta\right) \\
&= B\left(\hat{a}_0^W, \hat{a}_0^M\right) - \beta\hat{a}_1^W - (1-\beta)\,\hat{a}_1^M.
\end{aligned}$$

Now suppose that (A1) and (A2) hold for some $n \geq 1$. Let

$$B_n = \beta\alpha b\left(a_n^W\right) + (1-\beta)\,\alpha b\left(a_n^M\right) \qquad \text{and} \qquad \hat{B}_n = \beta\alpha b\left(\hat{a}_n^W\right) + (1-\beta)\,\alpha b\left(\hat{a}_n^M\right).$$

By hypothesis, $B_n \leq \hat{B}_n$. We have

$$\begin{aligned}
a_{n+1}^W &= \delta\frac{1-\beta}{\beta}\frac{1-p}{p}c + \delta^2 B_n, \qquad a_{n+1}^M = -\delta\tau + \delta^2 B_n, \\
\hat{a}_{n+1}^W &= \delta\frac{1-\beta}{\beta}\left(\frac{1-p}{p}c+\Delta\right) + \delta^2\hat{B}_n, \qquad \text{and} \qquad a_{n+1}^M = -\delta\left(\tau+\Delta\right) + \delta^2\hat{B}_n.
\end{aligned}$$

Note that

$$\begin{aligned}
B_{n+1} &= \beta\alpha b\left(a_{n+1}^W\right) + (1-\beta)\,\alpha b\left(a_{n+1}^M\right) \\
&\leq \beta\alpha b\left(\delta\frac{1-\beta}{\beta}\frac{1-p}{p}c + \delta^2\hat{B}_n\right) + (1-\beta)\,\alpha b\left(-\delta\tau + \delta^2\hat{B}_n\right) \\
&\leq \beta\alpha b\left(\hat{a}_{n+1}^W\right) + (1-\beta)\,\alpha b\left(\hat{a}_{n+1}^M\right) = \hat{B}_{n+1},
\end{aligned}$$

where the first inequality holds because b is increasing and $B_n \leq \hat{B}_n$, and the second inequality holds by the same argument as in the $n=1$ case, with $\hat{B}_n$ in place of B_0. Hence, (A1) holds for $n+1$. Moreover, (A2) holds for $n+1$, as we have $\beta a_{n+1}^W + (1-\beta)\,a_{n+1}^M = \delta\left(1-\beta\right)\left(\frac{1-p}{p}c-\tau\right) +$

$\delta^2 B_n$, and therefore

$$\begin{aligned} B\left(a_n^W, a_n^M\right) - \beta a_{n+1}^W - (1-\beta)\, a_{n+1}^M &= B_n\left(1-\delta^2\right) - \delta\,(1-\beta)\left(\frac{1-p}{p}c - \tau\right) \\ &\leq \hat{B}_n\left(1-\delta^2\right) - \delta\,(1-\beta)\left(\frac{1-p}{p}c - \tau\right) \\ &= B\left(\hat{a}_n^W, \hat{a}_n^M\right) - \beta \hat{a}_{n+1}^W - (1-\beta)\,\hat{a}_{n+1}^M. \end{aligned}$$

This completes the proof for a soft equilibrium.

Proof of Proposition 6

For the first claim, note that $\left(a^W, a^M\right)$ is now given as the greatest fixed point of the function

$$F\left(a^W, a^M\right) = \begin{pmatrix} \max\left\{\delta\frac{1-\beta}{\beta}\Pi^W + \min\left\{B\left(a^W, a^M\right) - \gamma^W, \delta^2\left(B\left(a^W, a^M\right) - \gamma^W\right)\right\}, 0\right\}, \\ \max\left\{\delta\left(\Pi^M - \Pi_T^M\right) + \min\left\{B\left(a^W, a^M\right) - \gamma^M, \delta^2\left(B\left(a^W, a^M\right) - \gamma^M\right)\right\}, 0\right\} \end{pmatrix}.$$

Since F is increasing in $\left(a^W, a^M\right)$ and decreasing in $\left(\gamma^W, \gamma^M\right)$, its greatest fixed point is decreasing in γ^W and γ^M by Theorem 1 of Milgrom and Roberts (1994). Hence, since $\delta < \bar{\delta}$ (so V^W and V^M are increasing in a^W and a^M), V^W and V^M are both decreasing in γ^W and γ^M, and hence so are workers' and managers' overall payoffs. In addition, increasing either γ^W or γ^M shrinks the parameter range over which a soft or tough-but-fair equilibrium exists, because increasing either γ^W or γ^M makes both (18) and (19) harder to satisfy, both by decreasing V^M and also (for γ^M) by making (18) and (19) harder to satisfy for any fixed value of V^M.

The proof of the second claim is similar to the proof of Proposition 5.2. In particular, defining

$$\begin{aligned} F\left(a^W, a^M\right) &= \begin{pmatrix} \delta\frac{1-\beta}{\beta}\Pi^W + \delta^2 B\left(a^W, a^M\right), \\ \delta\left(\Pi^M - \Pi_T^M\right) + \min\left\{B\left(a^W, a^M\right) - \gamma^M, \delta^2\left(B\left(a^W, a^M\right) - \gamma^M\right)\right\} \end{pmatrix}, \qquad \text{and} \\ \hat{F}\left(a^W, a^M\right) &= \begin{pmatrix} \delta\frac{1-\beta}{\beta}\Pi^W + \delta^2\left(B\left(a^W, a^M\right) - \gamma^W + \Delta\right), \\ \delta\left(\Pi^M - \Pi_T^M\right) + \min\left\{B\left(a^W, a^M\right) - \gamma^M - \frac{\beta}{1-\beta}\Delta, \delta^2\left(B\left(a^W, a^M\right) - \gamma^M - \frac{\beta}{1-\beta}\Delta\right)\right\} \end{pmatrix}, \end{aligned}$$

(which are the equations defining the maximum incentive compatible community effort levels when $a^M > 0$ and $B\left(a^W, a^M\right) > \gamma$), the same argument as in the proof of Proposition 5.2 shows that, whenever $a^W > a^M$, $B\left(a^W, a^M\right)$ is larger at the greatest fixed point of F than at the greatest fixed point of $\hat{F}$.

Proof of Proposition 7

Suppose first that $e'' \leq 0$ and $k'' \geq 0$. Since managers do not participate in community interactions, the soft equilibrium exists at parameter θ if and only if there exists $\ell > 0$ such that

$$e(\ell) \leq \frac{\delta^2}{1-\delta^2}\left(\Pi_S^M(\theta,\ell) - \Pi_T^M(\theta)\right), \tag{A3}$$

where

$$\Pi_T^M(\theta) = \max_\ell \Pi_T^M(\theta,\ell) = \max_\ell \theta g(\ell) - \frac{c}{q}\ell - k(\ell) \tag{A4}$$

and

$$\Pi_S^M(\theta,\ell) = \theta g(\ell) - \left(\frac{c}{p} - d\right)\ell - e(\ell). \tag{A5}$$

Equivalently, the soft equilibrium exists at parameter θ if and only if

$$\hat{\Pi}_S^M(\theta) \geq \Pi_T^M(\theta), \tag{A6}$$

where

$$\begin{aligned}
\hat{\Pi}_S^M(\theta) &= \max_\ell \hat{\Pi}_S^M(\theta,\ell) \\
&= \max_\ell \theta g(\ell) - \left(\frac{c}{p} - d\right)\ell - e(\ell) - \frac{1-\delta^2}{\delta^2}e(\ell) \\
&= \max_\ell \theta g(\ell) - \left(\frac{c}{p} - d\right)\ell - \frac{e(\ell)}{\delta^2}.
\end{aligned}$$

Let $\ell_T(\theta) = \text{argmax}_\ell \Pi_T^M(\theta,\ell)$ and $\ell_S(\theta) = \text{argmax}_\ell \hat{\Pi}_S^M(\theta,\ell)$.

Lemma A2 *If $\ell_S(\theta) \leq \ell_T(\theta)$ and $\ell_S(\theta') \geq \ell_T(\theta')$ then $\theta \leq \theta'$.*

Proof. To ease notation, let $\ell = \ell_S(\theta)$ and $\ell' = \ell_S(\theta')$. Since $g'' < 0$ and $k'' \geq 0$, $\Pi_T^M\left(\tilde{\theta},\ell\right)$ is concave in ℓ. Hence, we have

$$\frac{d}{d\ell}\Pi_T^M(\theta',\ell') \leq 0 = \frac{d}{d\ell}\hat{\Pi}_S^M(\theta',\ell') = \frac{d}{d\ell}\hat{\Pi}_S^M(\theta,\ell) \leq \frac{d}{d\ell}\Pi_T^M(\theta,\ell),$$

where the first inequality follows by concavity of Π_T^M in ℓ and $\ell' \geq \ell_T(\theta')$; the equalities are the first-order conditions for ℓ' and ℓ; and the second inequality follows by concavity of Π_T^M in ℓ and $\ell \leq \ell_T(\theta)$. Hence,

$$\begin{aligned}
\theta' g'(\ell') - \frac{c}{q} - k'(\ell') &\leq \theta' g'(\ell') - \frac{c}{p} + d - \frac{e'(\ell')}{\delta^2}, \\
\theta g'(\ell) - \frac{c}{q} - k'(\ell) &\geq \theta g'(\ell) - \frac{c}{p} + d - \frac{e'(\ell)}{\delta^2}.
\end{aligned}$$

Combining these inequalities, we have

$$k'(\ell) - k'(\ell') \leq \frac{e'(\ell) - e'(\ell')}{\delta^2}.$$

Since k' is increasing and e' is decreasing, we have $\ell \leq \ell'$. Finally, since $\ell_S(\theta)$ is an strictly increasing function (by Topkis's theorem), we have $\theta \leq \theta'$. ■

Now, note that

$$\hat{\Pi}_S^M(0) = \Pi_T^M(0)$$

and

$$\frac{\partial \hat{\Pi}_S^M\left(\tilde{\theta}, \ell_S\left(\tilde{\theta}\right)\right)}{\partial \tilde{\theta}} = \ell_S\left(\tilde{\theta}\right) \qquad \text{and} \qquad \frac{\partial \Pi_T^M\left(\tilde{\theta}, \ell_T\left(\tilde{\theta}\right)\right)}{\partial \tilde{\theta}} = \ell_T\left(\tilde{\theta}\right).$$

Hence, by the integral envelope theorem (Milgrom and Segal 2002) ,

$$\hat{\Pi}_S^M(\theta) - \Pi_T^M(\theta) = \int_0^\theta \left(\ell_S\left(\tilde{\theta}\right) - \ell_T\left(\tilde{\theta}\right)\right) d\tilde{\theta}.$$

By Lemma A2, there exists θ^* such that

$$\ell_S\left(\tilde{\theta}\right) - \ell_T\left(\tilde{\theta}\right) \geq 0 \qquad \Longleftrightarrow \qquad \tilde{\theta} \geq \theta^*.$$

Hence, there exists $\hat{\theta}$ such that (A6) holds—and hence a soft equilibrium exists—if and only if $\theta \geq \hat{\theta}$.

Similarly, if $e'' \geq 0$ and $k'' \leq 0$, then there is a threshold $\hat{\theta}$ such that the soft equilibrium exists if and only if $\theta \leq \hat{\theta}$. The argument is symmetric. (In the proof of the lemma, now we use that $\Pi_S^M\left(\tilde{\theta}, \ell\right)$ is concave.)

Proof of Proposition 8

For the first part, by the first part of Proposition 7, a soft equilibrium continues to exist as productivity increases. Moreover, an increase in productivity increases managers' employment rents $\Pi_S^M(\theta)$, as well as managers' labor demand $\ell_S(\theta)$. Note that worker utility in employment relations is given by

$$\frac{1-\beta}{\beta}\frac{1-p}{p} c \ell_S(\theta).$$

Hence, worker employment utility—and hence worker community effort and worker utility from community interactions—is increasing in $\ell_S(\theta)$, and hence also in θ. Thus, an increase in productivity increases managers' utility in employment relations (and leaves fixed managers' utility of γ^M from opting out of community interactions), as well as workers' utility in both employment and community interactions.

For the second part, we give an explicit example. Suppose that $\beta = .99$, $L = 50$, $c = .35$,

$p = .55$, $q = .72$, $g(\ell) = \ell^{.84}$, $k(\ell) = .38\ell^{.34}$, $d = .14$, $e(\ell) = .01\ell^{1.19}$, $\delta = .58$, and $\theta = .95$. Since we are assuming that managers opt out of community interactions, it suffices to focus on managers' and workers' employment rents: in particular, the function $b(a)$ is immaterial. In what follows, for all maximization problems over ℓ, recall that $\ell \in \{0, 1, \ldots, L\}$. Recall that manager profit is

$$\Pi_T^M = \max_\ell \theta g(\ell) - \frac{c}{q}\ell - k(\ell),$$

tough labor demand is

$$\ell_T = \operatorname*{argmax}_\ell \theta g(l) - \frac{c}{q}\ell - k(\ell),$$

tough worker rent is

$$\Pi_T^W = \frac{1-\beta}{\beta}\frac{1-q}{q}c\ell_T(\theta),$$

soft manager profit is

$$\begin{aligned} \Pi_S^M &= \max_\ell \theta g(\ell) - \left(\frac{c}{p} - d\right)\ell - e(\ell) \\ \text{subject to} \qquad e(\ell) &\leq \delta^2\left(\theta g(\ell) - \left(\frac{c}{p} - d\right)\ell - \Pi_T^M\right) \end{aligned}$$

(where, if the constraint is violated for all $\ell \in \{0, 1, \ldots, L\}$, then a soft equilibrium does not exist), soft labor demand is

$$\begin{aligned} \ell_S &= \operatorname*{argmax}_\ell \theta g(l) - \left(\frac{c}{p} - d\right)\ell - e(\ell) \\ \text{subject to} \qquad e(\ell) &\leq \frac{\delta^2}{1-\delta^2}\left(\Pi_S^M - \Pi_T^M\right), \end{aligned}$$

and soft worker rent at productivity θ is

$$\Pi_S^W = \frac{1-\beta}{\beta}\frac{1-p}{p}c\ell_S(\theta).$$

With the parameters specified above, a soft equilibrium exists, and we have

$$\begin{aligned} \ell_T &= 17, \qquad \Pi_T^M = 1.004, \qquad \Pi_T^W = .02337, \\ \ell_S &= 15, \qquad \Pi_S^M = 1.543, \qquad \Pi_S^W = .04339. \end{aligned}$$

Now suppose that θ increases to .99. Then a soft equilibrium no longer exists (i.e., the above constraint is violated for all ℓ), and we have $\ell_T = 23$, $\Pi_T^M = 1.503$, and $\Pi_S^W = .03162$. Therefore, both managers and workers are better-off in the soft equilibrium with productivity .95 than in the the tough equilibrium with productivity .99.

Data Sources and Variable Construction

We use four different data sources: IPUMS-USA (from where we drove most of our socioeconomic variables), IPUMS-NHGIS (which we use for computing residential segregation), Northeast Regional Center for Rural Development Social Capital Index, or NRCRDSC (for the number of bowling alleys) and Department of Labor-OSHA (for labor complaints).

IPUMS-USA

We use two samples from IPUMS-USA archives: 1990 Census 5% sample and 2009-2014 American Community Survey (ACS) 5-year samples (Ruggles et al. 2023). We construct the following variables using these data:

1. **Ratio of manager to non-supervisory production worker wages:** In computing wages, we limit the sample to full-time (more than 35 hours a week) full-year (more than 50 weeks a year) non-farm privately employed workers. We also exclude the self-employed and drop any observations for which occupation is unknown.

   We define "managers" as workers employed in occupations that include the word supervisor, manager or administrator in them. We further include a number of high-pay occupations, with similar social economic and demographic characteristics as managers, in particular lawyers, engineers and doctors combined this category. Average wages of managers are very similar across commuting zones when these latter groups are not included with managers. All other occupations are defined as non-supervisory production workers, or simply "workers".

   For our geographic units of observation, we use the 1990 definitions of commuting zones outlined in Tolbert and Sizer (1996). We focus on 722 commuting zones in the continental United States, which drops Alaska and Hawaii. Commuting zone level estimates for the average wages of managers relative to workers are computed following the standard practice of assigning data points in Public Use Microdata Areas to commuting zones by population probability weighted averages (Autor and Dorn 2013; Autor, Dorn, and Hanson 2019). Throughout, we focus on the natural logarithm of the ratio of managerial to worker wages.

2. **Monitoring workers per capita:** We rely on the same sample of full-time full-year non-farm private workers. We define monitoring workers as managerial workers including administrative support and human resources employees, but excluding lawyers, engineers and doctors, since for this variable we are explicitly focusing on workers that engage in monitoring-like activities in modern organizations. The number of monitoring workers in each commuting zone is computed using the same procedure as for the ratio manager to worker wages. We obtain a per capita measure by dividing the number of monitoring employees by the population of the commuting zone in 1990. This choice is motivated, as stated in the text, with our desire to avoid potentially endogenous changes in commuting zone population. This variable is also used in (natural) log form throughout.

3. **Private schooling:** We use the 1990 Census 5% sample and 2009-2014 American Community Survey (ACS) five-year samples (Ruggles et al. 2023). We limit the sample to households that contain individuals who are currently in school and have not yet completed tthe 12th grade. We then identify whether there are any managers (defined in

the same way as above, including lawyers, engineers and doctors) in each household and generate the rate of enrollment in private schooling among households with one or more managers vs. household with no managers.

4. **Ratio of wages at 90th versus 50th percentile:** Following Acemoglu and Autor (2011), we construct an alternative measure of inequality to the ratio of managerial to non managerial wages. We use the same sample as the first inequality measure and generate percentiles of earning by commuting zone. We focus on the ratio of individual wages at 90th versus 50th percentile of the distribution. This variable is used in (natural) log form throughout.

IPUMS-NHGIS

We use the same two sample counterparts in the IPUMS-NHGIS data as we did for the IPUMS-USA data: 1990 Census 5% and 2009-2014 American Community Survey (ACS) five-year (Manson et al. 2023). Unlike IPUMS-USA, NHGIS includes statistics derived from the entire population. For Census variables, these values are exact. For ACS data, we focus on the reported estimates. We construct the following variables using these data:

1. **Residential segregation:** We focus on the residential segregation of the "rich", defined as households in the top 25% of the household income distribution. Following (Chetty et al. 2014; Reardon and Bischoff 2011) , we construct the Theil (two-group entropy) index between the top 25% and the rest. This measure is defined as:

$$E(p) = p \log_2 \frac{1}{p} + (1-p) \log_2 \frac{1}{1-p}$$

where p is the share of the population above (or below) a certain income level. We define each income level to be the 75th percent in each commuting zone. We calculate the Theil index $E_j(p)$ for each Census tract j, and compute the residential segregation index for commuting zone i, H_i, by:[30]

$$H_i = \sum_j \left[\frac{\text{population}_j}{\text{population}_i} \frac{E_i - E_j}{E_i} \right].$$

Segregation indices can be interpreted as a population weighted averages of entropy, or what percentage of the population would need to be moved between Census tracts to achieve a uniform distribution across the commuting zone.

While data are available for all commuting zones, areas with lower population have fewer Census tracts, which makes their implied residential segregation less reliable, and we restrict this part of the analysis to commuting zones that have at least 100 Census tracts. This is a sample restriction simiar to Fogli and Guerrieri (2019), who focus exclusively on 280 Metropolitan areas in the United States as defined by the OMB.

2. **CZ-level demographic controls:** We use population and GDP per capita as controls in the regression specifications reported in the next section of this Appendix. We aggregate county-level data to the commuting zone level to construct these variables.

30. Each Census tract is composed of areas of a total population of approximately 4000 people. Each Census tract maps to a county, which is then mapped to a commuting zone.

Northeast Regional Center for Rural Development Dataset

We use the county-level measures of social capital compiled by the NRCRD (Rupasingha, Goetz, and Freshwater 2006). The dataset includes the numbers of various types of associations covering all counties in the United States, including the number of bowling alleys. We aggregate the county-level numbers to the commuting zone.

We use the natural logarithms of the number of bowling alleys divided by the population of the commuting zone in 1990, for the same reasons as using fixed population denominator in the monitoring workers per capita. In this case our sample covers 560 of 722 commuting zones that have bowling alleys in both 1990 and 2014.

Department of Labor-OSHA Data

OSHA compiles and reports all investigations that they have conducted since the 1970s and these data have been used to assess work standards (Marinescu, Qiu, and Sojourner 2021). The dataset contains the reasons for the investigation (regular random check, complaint, etc). We focus on investigations due to a worker complaint and select the decade in which the complaint was filed. We match the zip code of the workplace against which the complaint was filed to commuting zones. For 1990, we focus on complaints from the 1980s and for 2014, we focus on complaints from the 2010s. We use the natural logarithms of the number of complaints divided by the population of the commuting zone in 1990, for the same reasons as above. In this case our sample covers the 671 commuting zones that have had at least one complaint in both 1980s and 2010s.

Regression Results

In this section of the Appendix, we present regression estimatesfrom specifications similar to those that were shown in the figures in the Introduction. We focus on the same five dependent variables: residential segregation, the ratio of private school enrollment between managers versus workers, bowling alleys per capita, labor complaints per capita and the number of managerial, administrative and human resource employees per capita. All of these variables are in logarithms as specified above. Our key right and side variable is the (log) ratio of manager to worker wages. For each variable, we report six estimates, three unweighted and three weighted estimates. Columns 1 and 4 show the bivariate relationship, as reported in the Introduction. Columns 2 and 5 include Census division dummies, and columns 3 and 6 additionally include log population and log GDP per capita of the commuting zone in 1990, to allow for differential trends by these characteristics. As already noted, the inclusion of covariates or the weighting scheme do not materially affect the patterns reported in the Introduction. The exception to this statement are the ratio of private school enrollment and labor complaints variables, where the weighted estimates are much weaker.

Additional References for Online Appendix

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Table A.1: Residential segregation

	(1) no weights	(2) no weights	(3) no weights	(4) pop weights	(5) pop weights	(6) pop weights
			A: Ratio of managerial to nonmanagerial wages			
1990:						
Ratio of managerial to non-managerial wages	0.135	0.141	0.048	0.169	0.189	0.046
	(0.021)	(0.024)	(0.019)	(0.032)	(0.025)	(0.022)
Population			0.017			0.014
			(0.003)			(0.002)
GDP per capita			0.053			0.059
			(0.012)			(0.009)
2014:						
Ratio of managerial to non-managerial wages	0.108	0.111	0.039	0.126	0.135	0.046
	(0.018)	(0.019)	(0.015)	(0.011)	(0.012)	(0.014)
Population			0.023			0.017
			(0.003)			(0.003)
GDP per capita			0.021			0.029
			(0.016)			(0.012)
Long Differences:						
Ratio of managerial to non-managerial wages	0.036	0.042	0.040	0.047	0.059	0.059
	(0.018)	(0.021)	(0.023)	(0.018)	(0.018)	(0.022)
Population			0.003			0.001
			(0.002)			(0.001)
GDP per capita			-0.005			-0.005
			(0.011)			(0.012)
			B: Ratio of wages at 90th versus 50th percentile			
1990:						
90-50 wage ratio	0.181	0.240	0.136	0.201	0.277	0.090
	(0.034)	(0.047)	(0.031)	(0.048)	(0.045)	(0.037)
Population			0.016			0.013
			(0.003)			(0.002)
GDP per capita			0.060			0.063
			(0.011)			(0.009)
2014:						
90-50 wage ratio	0.233	0.291	0.118	0.231	0.285	0.110
	(0.025)	(0.026)	(0.041)	(0.028)	(0.027)	(0.040)
Population			0.021			0.016
			(0.003)			(0.003)
GDP per capita			0.014			0.019
			(0.018)			(0.014)
Long Differences:						
90-50 wage ratio	0.043	0.046	0.044	0.041	0.059	0.091
	(0.019)	(0.022)	(0.033)	(0.018)	(0.019)	(0.028)
Population			0.002			0.001
			(0.002)			(0.002)
GDP per capita			-0.008			-0.019
			(0.012)			(0.014)
Census Division Dummies	No	Yes	Yes	No	Yes	Yes
Observations	127	127	127	127	127	127

Notes: Residential segregation is computed as the two-group entropy index for residents in the bottom 75 percent and top 25 percent of the commuting zone household income distribution (see previous section for formulas). Ratio of managerial to non-managerial wages is the logarithm of the ratio of wages of managerial workers (including lawyers, engineers, and physicians) to non-managerial workers. 90-50 wage ratio is the log ratio of yearly wages at 90th versus 50th percentile of a Commuting Zone. This variable is constructed from the earnings of full-time full-year, non-farm private sector workers. The sample is limited to the 127 commuting zones with more than 100 Census tracts. Panel A reports results for ratio of managerial to non-managerial wages and panel B for 90-50 wage ratio. Each panel reports cross-sectional estimates for 1990, 2014 and a long-differences estimate (change between 2014 and 1990). The first three columns are unweighted, while the last three columns report weighted regressions using population in 1990 as weights. Columns 1 and 4 show the bivariate relationship, as reported in the Introduction. Columns 2 and 5 include Census division dummies, and columns 3 and 6 additionally include log population and log GDP per capita of the commuting zone in 1990. Heteroscedasticity-robust standard errors are included in parentheses.

Table A.2: Ratio of private school enrollment between children of managers versus non-managers

	(1) no weights	(2) no weights	(3) no weights	(4) pop weights	(5) pop weights	(6) pop weights
			A: Ratio of managerial to nonmanagerial wages			
1990:						
Ratio of managerial to non-managerial wages	0.156	0.123	0.094	0.166	0.159	0.079
	(0.014)	(0.014)	(0.017)	(0.020)	(0.019)	(0.021)
Population			0.007			0.011
			(0.001)			(0.002)
GDP per capita			-0.006			-0.015
			(0.008)			(0.014)
2014:						
Ratio of managerial to non-managerial wages	0.109	0.096	0.067	0.113	0.114	0.060
	(0.009)	(0.009)	(0.010)	(0.011)	(0.012)	(0.016)
Population			0.008			0.006
			(0.001)			(0.001)
GDP per capita			-0.002			0.036
			(0.009)			(0.013)
Long Differences:						
Ratio of managerial to non-managerial wages	0.059	0.058	0.056	0.048	0.044	0.023
	(0.014)	(0.014)	(0.014)	(0.017)	(0.018)	(0.018)
Population			0.001			-0.002
			(0.001)			(0.002)
GDP per capita			0.003			0.034
			(0.009)			(0.011)
			B: Ratio of wages at 90th versus 50th percentile			
1990:						
90-50 wage ratio	0.118	0.082	0.082	0.213	0.214	0.081
	(0.023)	(0.020)	(0.019)	(0.037)	(0.035)	(0.031)
Population			0.009			0.013
			(0.001)			(0.002)
GDP per capita			0.007			-0.010
			(0.009)			(0.015)
2014:						
90-50 wage ratio	0.202	0.256	0.193	0.191	0.222	0.085
	(0.016)	(0.016)	(0.019)	(0.017)	(0.019)	(0.038)
Population			0.007			0.008
			(0.001)			(0.002)
GDP per capita			0.005			0.034
			(0.008)			(0.013)
Long Differences:						
90-50 wage ratio	0.049	0.065	0.061	0.065	0.071	0.038
	(0.017)	(0.018)	(0.020)	(0.019)	(0.023)	(0.025)
Population			0.001			-0.002
			(0.001)			(0.002)
GDP per capita			0.001			0.029
			(0.010)			(0.011)
Census Division Dummies	No	Yes	Yes	No	Yes	Yes
Observations	722	722	722	722	722	722

Notes: Ratio of managerial to non-managerial private school enrollment is the private school enrollment rate of children or dependents of managers minus the private school enrollment rate of non- managers in the commuting zone. Ratio of managerial to non-managerial wages is the logarithm of the ratio of wages of managerial workers (including lawyers, engineers, and physicians) to non-managerial workers. 90-50 wage ratio is the log ratio of yearly wages at 90th versus 50th percentile of a Commuting Zone. This variable is constructed from the earnings of full-time full-year, non-farm private sector workers. This sample includes all 722 commuting zones. Panel A reports results for ratio of managerial to non-managerial wages and panel B for 90-50 wage ratio. Each panel reports cross-sectional estimates for 1990, 2014 and a long-differences estimate (change between 2014 and 1990). The first three columns are unweighted, while the last three columns report weighted regressions using population in 1990 as weights. Columns 1 and 4 show the bivariate relationship, as reported in the Introduction. Columns 2 and 5 include Census division dummies, and columns 3 and 6 additionally include log population and log GDP per capita of the commuting zone in 1990. Heteroscedasticity-robust standard errors are included in parentheses.

Table A.3: Number of bowling alleys per capita in log points

	(1) no weights	(2) no weights	(3) no weights	(4) pop weights	(5) pop weights	(6) pop weights
			A: Ratio of managerial to nonmanagerial wages			
1990:						
Ratio of managerial to non-managerial wages	-2.692	-1.365	-0.298	-2.981	-2.080	-0.844
	(0.226)	(0.207)	(0.202)	(0.311)	(0.233)	(0.271)
Population			-0.322			-0.166
			(0.026)			(0.029)
GDP per capita			0.716			0.158
			(0.173)			(0.189)
2014:						
Ratio of managerial to non-managerial wages	-1.963	-1.230	-0.185	-2.175	-1.688	-0.824
	(0.211)	(0.172)	(0.156)	(0.194)	(0.223)	(0.293)
Population			-0.347			-0.167
			(0.018)			(0.032)
GDP per capita			0.797			0.162
			(0.148)			(0.202)
Long Differences:						
Ratio of managerial to non-managerial wages	-0.535	-0.470	-0.379	-1.296	-1.191	-0.879
	(0.244)	(0.250)	(0.253)	(0.350)	(0.358)	(0.343)
Population			-0.062			-0.034
			(0.021)			(0.029)
GDP per capita			-0.012			-0.084
			(0.160)			(0.187)
			B: Ratio of wages at 90th versus 50th percentile			
1990:						
90-50 wage ratio	-4.200	-1.473	-0.685	-6.085	-4.306	-2.771
	(0.522)	(0.472)	(0.395)	(0.526)	(0.397)	(0.474)
Population			-0.325			-0.138
			(0.026)			(0.027)
GDP per capita			0.647			0.022
			(0.177)			(0.187)
2014:						
90-50 wage ratio	-5.082	-3.224	-0.499	-4.723	-3.730	-2.437
	(0.330)	(0.354)	(0.373)	(0.297)	(0.345)	(0.631)
Population			-0.344			-0.139
			(0.020)			(0.035)
GDP per capita			0.779			0.316
			(0.146)			(0.180)
Long Differences:						
90-50 wage ratio	-0.208	-0.081	0.565	-0.910	-0.733	0.360
	(0.271)	(0.295)	(0.353)	(0.327)	(0.333)	(0.433)
Population			-0.067			-0.043
			(0.022)			(0.032)
GDP per capita			-0.142			-0.236
			(0.171)			(0.185)
Census Division Dummies	No	Yes	Yes	No	Yes	Yes
Observations	560	560	560	560	560	560

Notes: Bowling alleys per capita is the logarithm of the number of bowling alleys divided by population of the commuting zone in 1990. Ratio of managerial to non-managerial wages is the logarithm of the ratio of wages of managerial workers (including lawyers, engineers, and physicians) to non-managerial workers. 90-50 wage ratio is the log ratio of yearly wages at 90th versus 50th percentile of a Commuting Zone. This variable is constructed from the earnings of full-time full-year, non-farm private sector workers. The sample is limited to 560 commuting zones that had at least 1 bowling alley in 1990 and 2014. Panel A reports results for ratio of managerial to non-managerial wages and panel B for 90-50 wage ratio. Each panel reports cross-sectional estimates for 1990, 2014 and a long-differences estimate (change between 2014 and 1990). The first three columns are unweighted, while the last three columns report weighted regressions using population in 1990 as weights. Columns 1 and 4 show the bivariate relationship, as reported in the Introduction. Columns 2 and 5 include Census division dummies, and columns 3 and 6 additionally include log population and log GDP per capita of the commuting zone in 1990. Heteroscedasticity-robust standard errors are included in parentheses.

Table A.4: Number of managerial, administrative and HR employees per capita, in log points

	(1) no weights	(2) no weights	(3) no weights	(4) pop weights	(5) pop weights	(6) pop weights
			A: Ratio of managerial to nonmanagerial wages			
1990:						
Ratio of managerial to non-managerial wages	1.121	1.182	0.477	1.963	2.148	0.532
	(0.112)	(0.117)	(0.074)	(0.168)	(0.153)	(0.104)
Population			0.064			0.044
			(0.008)			(0.012)
GDP per capita			1.143			1.350
			(0.069)			(0.090)
2014:						
Ratio of managerial to non-managerial wages	1.224	1.184	0.376	1.301	1.398	0.048
	(0.103)	(0.109)	(0.081)	(0.214)	(0.155)	(0.141)
Population			0.125			0.129
			(0.009)			(0.020)
GDP per capita			0.993			1.107
			(0.088)			(0.182)
Long Differences:						
Ratio of managerial to non-managerial wages	0.344	0.271	0.236	-0.061	0.111	0.081
	(0.109)	(0.110)	(0.113)	(0.199)	(0.126)	(0.129)
Population			0.014			-0.015
			(0.011)			(0.017)
GDP per capita			0.048			0.127
			(0.095)			(0.107)
			B: Ratio of wages at 90th versus 50th percentile			
1990:						
90-50 wage ratio	-0.530	-0.419	0.076	1.057	1.808	-0.320
	(0.178)	(0.189)	(0.136)	(0.342)	(0.386)	(0.338)
Population			0.078			0.077
			(0.008)			(0.012)
GDP per capita			1.174			1.347
			(0.071)			(0.103)
2014:						
90-50 wage ratio	1.964	2.224	0.642	2.647	3.113	0.019
	(0.190)	(0.256)	(0.182)	(0.533)	(0.434)	(0.403)
Population			0.130			0.132
			(0.008)			(0.021)
GDP per capita			1.043			1.109
			(0.088)			(0.188)
Long Differences:						
90-50 wage ratio	0.259	0.326	0.208	-0.117	0.393	0.579
	(0.138)	(0.140)	(0.166)	(0.237)	(0.146)	(0.223)
Population			0.012			-0.019
			(0.011)			(0.016)
GDP per capita			0.045			0.032
			(0.098)			(0.102)
Census Division Dummies	No	Yes	Yes	No	Yes	Yes
Observations	722	722	722	722	722	722

Notes: Managerial, administrative and human resource employees per capita is the logarithm of the number of managerial, administrative and human resource employees divided by the population of the commuting zone in 1990. Ratio of managerial to non-managerial wages is the logarithm of the ratio of wages of managerial workers (including lawyers, engineers, and physicians) to non-managerial workers. 90-50 wage ratio is the log ratio of yearly wages at 90th versus 50th percentile of a Commuting Zone. This variable is constructed from the earnings of full-time full-year, non-farm private sector workers. This sample includes all 722 commuting zones. Panel A reports results for ratio of managerial to non-managerial wages and panel B for 90-50 wage ratio. Each panel reports cross-sectional estimates for 1990, 2014 and a long-differences estimate (change between 2014 and 1990). The first three columns are unweighted, while the last three columns report weighted regressions using population in 1990 as weights. Columns 1 and 4 show the bivariate relationship, as reported in the Introduction. Columns 2 and 5 include Census division dummies, and columns 3 and 6 additionally include log population and log GDP per capita of the commuting zone in 1990. Heteroscedasticity-robust standard errors are included in parentheses.

Table A.5: Labor complaints per capita, in log points (decadely

	(1) no weights	(2) no weights	(3) no weights	(4) pop weights	(5) pop weights	(6) pop weights
			A: Ratio of managerial to nonmanagerial wages			
1980s:						
Ratio of managerial to non-managerial wages	0.052	0.494	-0.130	0.048	0.435	0.460
	(0.232)	(0.259)	(0.260)	(0.851)	(0.373)	(0.600)
Population			0.027			-0.107
			(0.037)			(0.069)
GDP per capita			1.329			0.929
			(0.230)			(0.302)
2010s:						
Ratio of managerial to non-managerial wages	0.646	0.592	0.221	-0.435	-0.302	-0.412
	(0.203)	(0.191)	(0.233)	(0.231)	(0.244)	(0.270)
Population			0.001			-0.004
			(0.024)			(0.052)
GDP per capita			1.018			0.242
			(0.199)			(0.417)
Long Differences:						
Ratio of managerial to non-managerial wages	1.162	0.392	0.548	2.557	0.371	0.971
	(0.417)	(0.411)	(0.431)	(1.021)	(0.553)	(0.560)
Population			-0.066			-0.038
			(0.035)			(0.051)
GDP per capita			-0.171			-0.335
			(0.303)			(0.337)
			B: Ratio of wages at 90th versus 50th percentile			
1980s:						
90-50 wage ratio	-2.632	-2.068	-1.725	-1.783	-1.463	-1.843
	(0.402)	(0.434)	(0.419)	(1.233)	(0.758)	(1.150)
Population			0.046			-0.040
			(0.036)			(0.071)
GDP per capita			1.136			0.851
			(0.236)			(0.320)
2010s:						
90-50 wage ratio	-0.592	-0.149	-1.132	-0.804	-0.617	-1.021
	(0.379)	(0.479)	(0.564)	(0.417)	(0.433)	(0.626)
Population			0.034			0.001
			(0.025)			(0.061)
GDP per capita			1.090			0.297
			(0.193)			(0.429)
Long Differences:						
90-50 wage ratio	1.096	-0.419	0.115	3.350	-0.087	1.670
	(0.535)	(0.532)	(0.623)	(1.290)	(0.681)	(0.816)
Population			-0.068			-0.044
			(0.036)			(0.050)
GDP per capita			-0.120			-0.536
			(0.312)			(0.336)
Census Division Dummies	No	Yes	Yes	No	Yes	Yes
Observations	671	671	671	671	671	671

Notes: Labor complaints per capita is the logarithm of the decadely number of labor complaints recorded by Occupational Safety and Health Administration (OSHA) divided by the population of the commuting zone in 1990. Ratio of managerial to non-managerial wages is the logarithm of the ratio of wages of managerial workers (including lawyers, engineers, and physicians) to non-managerial workers. 90-50 wage ratio is the log ratio of yearly wages at 90th versus 50th percentile of a Commuting Zone. This variable is constructed from the earnings of full-time full-year, non-farm private sector workers. The sample is limited to 671 commuting zones that had at least 1 recorded complaint in 1980s and 2010s. Panel A reports results for ratio of managerial to non-managerial wages and panel B for 90-50 wage ratio. Each panel reports cross-sectional estimates for 1980s, 2010s and a long-differences estimate (change between 1980s and 2010s). The first three columns are unweighted, while the last three columns report weighted regressions using population in 1990 as weights. Columns 1 and 4 show the bivariate relationship, as reported in the Introduction. Columns 2 and 5 include Census division dummies, and columns 3 and 6 additionally include log population and log GDP per capita of the commuting zone in 1990. Heteroscedasticity-robust standard errors are included in parentheses.