Employment and Community: Socioeconomic Cooperation and Its Breakdown*

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Abstract

We model the interplay of employment relations 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 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 public goods. The threat of losing access to public goods can motivate managers to keep employment soft; conversely, the threat of losing future employment or future workers' trust can motivate workers and managers to provide 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: employment, community, monitoring, efficiency wages, cooperation, public goods, 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 meat-packer, discussing the 1985 Hormel strike (*The Atlantic*, February 10, 2022).

1 Introduction

Informal, community-based interactions and formal economic interactions such as employment are connected in myriad ways. The importance of weak ties—information and recommendations from social contacts and community members—in finding a job is one of the most celebrated findings of economic sociology (Granovetter 1973, 1985; Montgomery 1991; Calvo-Armengol and Jackson 2004). More broadly, a literature dating back to Polanyi (1944) emphasizes the socially embedded nature of economic exchange and employment, while Solow (1990) calls for viewing the labor market as "a social institution."[1] Conversely, the impacts of (un)employment and economic inequality on communities are no less important: these have been proposed as root causes of social problems including crime, teenage pregnancy, underperformance in schools, and the dissolution of families (Wilson 1996, Putnam 2000, 2016, Murray 2012, Rajan 2019). Indeed, several studies report evidence that negative economic shocks have large impacts on social and family outcomes (Black, McKinnish, and Sanders 2003; Autor, Dorn, and Hanson 2019).

Consistent with an interdependence between community and employment interactions, many social and economic indicators co-move in the US time series. Putnam (2020) documents that measures of civic participation, trust, and social cohesion improved from the 1940s onward, when economic opportunities expanded and inequality declined. Data from the National Opinion Research Center indicate that the fraction of Americans who said that most people can be trusted increased from around 69% in 1948 to 79% in 1964 (Erskine 1964). Recent decades, however, have shown the opposite pattern. Real wages for non-college workers have stagnated (and for some groups, even declined) since 1980, while labor market outcomes for managerial and professional workers have improved (Acemoglu

1. Community-level factors are also critical for education (e.g., Chetty et al. 2018) and socialization (e.g., Boyd and Richerson 1985), and there is growing appreciation that community and social connections affect economic mobility (e.g., Chetty, Hendren, and Katz 2016, Chetty and Hendren 2018, Chetty et al. 2022).

and Autor 2011; Autor 2019). At the same time, there has been a deterioration in civic participation, trust, and community ties. According to the General Social Survey (GSS), around 1980 more than 75% of Americans spent at least one social evening during the year with someone in their neighborhood; by 2019, before the pandemic, this share had fallen to less than 70%. The GSS also indicates that the share of Americans with no membership in any non-religious civic association increased from around 35% in the early 1980s to over 45% in 2004,[2] while the share of Americans who said that most people can be trusted plunged from around 40% in 1975 to just above 20% in 2022.[3] These weakening civic ties are reflected in how much Americans appear to be willing to make sacrifices for the good of others, as measured for example by blood donations per capita, which have declined from the early 1990s by about one third (Wallace et al. 1998; Free et al. 2023). Other measures of the health of American communities are also in decline: 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 various dimensions of civic-mindedness and trust have declined (Rainie and Perrin 2019). Finally, the same period has also witnessed changes in the internal organization and management strategies of firms, with evidence suggesting both a shift toward less worker-friendly management practices (Stansbury and Summers 2020; Acemoglu, He, and Maire 2023) and more intensive worker monitoring (Gordon 1996).

The experiences of several US communities can illustrate these patterns and give us clues about the underlying mechanisms. The meat-processing company Hormel, mentioned in the opening quote, was a mainstay of the town of Austin, Minnesota. Hormel provided well-paid jobs for workers, and its owners and managers were enmeshed in local civic life (Hage and Klauda 1989). When the company started automating and offshoring jobs and reducing wages in the 1980s, this had large effects on social life and cohesion in Austin. A similar case is the role of glass-maker Anchor Hocking in sustaining community relations in Lancaster, Ohio (Alexander 2017). Well-paid jobs at Anchor Hocking were an integral part of Lancaster's economy and a bedrock of the community, where managers and workers interacted closely, and their disappearance following cost-cutting efforts at Anchor Hocking "ripp[ed] a huge hole in the social fabric of the town," (Alexander 2017, p. 56). Similar examples abound throughout the US, Europe, and elsewhere. Significantly, the close social connections between Hormel and Anchor Hocking's managers and workers appear to have complicated these companies' restructuring efforts. The opening quote underscores that the prospect of losing their standing in the community was a major consideration for Hormel's

2. This question was discontinued in the GSS in 2004. The World Values Survey asks a similar question, which indicates that civic participation has remained at this low level since 2004.

3. These numbers are all authors' calculations from the GSS. The trust numbers from the National Opinion Research Center and the GSS are based on different methodologies and are not directly comparable.

managers when they started contemplating wage and job cuts. In the Anchor Hocking case, radical restructuring had to await the arrival of outside, venture capital-backed managers. More broadly, the available evidence suggests that workers' community standing influences their job prospects and that managers tend to adopt different strategies depending on the extent of their shared trust with workers and whether they live in the same community (see references below). For example, Putnam (2000) describes how civic or religious participation is critical for community standing and, via this channel, for economic opportunities. The statistical evidence in Topa (2001), Bayer, Ross, and Topa (2008), and Smith (2005) is broadly consistent with this interpretation.

Our Contribution. This paper develops a model of community-employment interactions. Reflecting the above evidence, our model features two forms of "embedding" of employment relations in local communities: the prospect of exclusion or ostracism in the community motivates managers to treat their workers better (as in the Hormel and Anchor Hocking cases), and the prospect of losing future employment opportunities through the loss of community standing or "weak ties" motivates workers to contribute to the community (along the lines of Wilson 1996 and Putnam 2000).[4] The key feature of our framework is that the magnitudes of both of these "threats" are endogenous and mutually determined: the severity of the threat of community exclusion depends on the level of community benefits provided by workers and managers; and the severity of the threat of losing future employment depends on the size of the economic surplus ("rent") generated by employment and the distribution of this surplus between workers and managers.

We find that the interdependence between employment and community can overturn basic neoclassical predictions regarding labor market performance and social welfare. In particular, we demonstrate that many apparently efficiency-enhancing technological and institutional changes—such as improvements in workplace monitoring technologies; automation, offshoring, or outsourcing; declines in the minimum wage; and opportunities for residential segregation or for privatizing community-provided services—can all induce a shift from more-trusting to less-trusting employment relations and reduce community cooperation, which can leave both workers and managers worse off.

More formally, we model repeated interactions between two types of agents—workers and managers—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).

4. Our full model also features a third form of embedding: the threat of losing future workers' trust in employment relations motivates managers to behave well in both employment and community interactions.

In the community, both workers and managers exert costly effort to provide community benefits (e.g., local public goods), which benefit all community members. This effort is observable and can be motivated by the threat of social ostracism and exclusion from future community benefits. For workers, it is additionally motivated by the threat of exclusion from future employment opportunities, because workers who are not in good standing in the community may not 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 motivate them to take actions that benefit others in the community. Since these rents differ across agents (employed workers, unemployed workers, and managers), so do different agents' equilibrium contributions to community benefits.

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 job flexibility or workplace amenities). Crucially, managers who mistreat their workers—either by monitoring them excessively or by reneging on expected favors—can be excluded from the community. If workers trust that managers will treat them well, worker effort will be motivated by both wages and favor exchange, and managers choose low-intensity monitoring, which leaves workers with high rents. We call this a *soft management regime*. In contrast, when workers do not expect favorable treatment, worker effort must be motivated only by wages, and managers choose high-intensity monitoring to reduce the required wage payments. This is a *tough management regime*. While worker rents are always higher in the 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 additionally save on monitoring costs. Tough management is always an equilibrium, while soft management is an equilibrium only if the equilibrium value of community benefits is large enough to deter managers from deviating from soft to tough management.

Overall welfare—taking into account both employment rents and community benefits—is typically higher for workers in a soft equilibrium, and can also be higher for managers in a soft equilibrium, even when manager profits are higher in a tough equilibrium. This is due to a *tough management externality*: when a manager is tough, this reduces worker rents and thereby discourages workers from contributing to the community, which adversely affects other managers as well as workers.[5]

Theoretically, our model is a multi-player, continuous-action prisoner's dilemma alternat-

5. When manager profits increase, they contribute more to the community, which counteracts and can even reverse this negative externality.

ing with a "rent-shifting game" (where managers influence the distribution of rents within the employment relationship and can renege on promises). The interplay of these two-game theoretic settings is novel to the best of our knowledge, and drives our main results, which concern how changes in on- and off-path payoffs in each game affect each party's maximum cooperation level in the prisoner's dilemma (community interactions) and behavior in the rent-shifting game (employment).

Our most noteworthy results are as follows. First, technological changes that make intensive monitoring more accurate or less expensive can make everyone worse off by encouraging managers to adopt intensive monitoring, which undermines the soft equilibrium and reduces community cooperation. Second, expanded opportunities for automation, offshoring, or outsourcing can make everyone worse off by reducing worker employment rents and hence reducing 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 also make everyone worse off. Interestingly, this happens even when managers do not actually opt out, because the mere presence of outside options for managers lessens the threat of exclusion, which both depresses their equilibrium community contributions and limits the community's ability to deter them from adopting tough management. Fifth, while in general improvements in workplace productivity can favor either a soft or tough equilibrium, they favor a tough equilibrium in the realistic case where a larger workforce creates economies of scale in monitoring and diseconomies of scale in favor exchange. Finally, when employment relationships are long-term, employed workers contribute more to the community than the unemployed.

Related Literature. We contribute to several strands of literature on the interaction of employment relations, community structure, and social norms. Seminal sociological works on the social embedding of economic interactions include Malinowski (1922), Polanyi (1944), and Thompson (1971).[6] Within economics, related issues are discussed in the efficiency wage and gift exchange literatures (Akerlof 1982; Weisskopf et al. 1983; Shapiro and Stiglitz 1984; Akerlof and Yellen 1986; Solow 1990; Falk 2007), but these works do not consider the social embeddedness of employment or the relationship between community and employment interactions. More closely related is Acemoglu and Newman (2002), who observe that, as in

6. Green (2012) gives a history of "company towns" in the United States, distinguishing between paternalistic "industrial Edens" like Pullman, Illinois or Hershey, Pennsylvania and exploitative "Satanic mills" like Ludlow, Colorado and Homestead, Pennsylvania. This resembles our distinction between soft and tough equilibria.

our model, managers have socially excessive incentives to monitor workers in order to shift efficiency wage rents from workers to themselves. Acemoglu and Newman and Gordon (1996) also 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 that workers' employment rents are negative (i.e., workers are compelled by force 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 from workers, but these actions are not coercive because workers still obtain non-negative rents. None of these works consider the interaction between employment and community relations.

A literature following Kandori (1992) studies dynamic cooperation in communities. A major question in this literature is whether market-based and informal (in our case, 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 2024). A theme of the "substitutes" papers is that, since markets can serve as outside options for community interactions, improved market efficiency can reduce welfare by undermining trust within communities. A theme 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 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 employment rents, which are critical for supporting community effort. Hence, in our model employment and community interactions are complements overall, but are substitutes "at the margin,": in the sense that efficiency gains in employment can undermine communities by altering the distribution of rents. Our focus on how the distribution of rents between two groups in one type of interaction affects the sustainability of cooperation in the other type is central to our analysis and, to the best of our knowledge, is novel to the repeated games literature.

Our framework and comparative statics can help interpret some recent evidence on corporate culture and worker–manager relations. Guiso, Sapienza, and Zingales (2015) find that firms perform better when workers view top managers as trustworthy and that this trust is harder to sustain in public firms; while Yonker (2017) finds that establishments located near the CEO's birthplace experience fewer employment and pay reductions in times of industry distress; see also Kim et al. (2020) and Bassanini et al. (2024); and Daniele

Amore, Bennedsen, and Larsen (2022) estimate that firms with locally-residing CEOs generate higher employee satisfaction, especially when the CEO's and employees' children attend the same school.[7] As we discuss, these findings are consistent with our comparative statics. In addition, Acemoglu, He, and Maire (2023) find that wages and the labor share are lower, and worker quits are higher, in firms run by CEOs with business degrees. This is consistent with our framework, presuming that CEOs with business degrees are more likely to adopt tough management (though their paper does not find evidence of more intensive monitoring by these managers).

A final relevant literature concerns residential segregation and neighborhood relations. Theoretical work in this area includes Benabou (1993, 1996), Durlauf (1994), Fernández and Rogerson (2001), and Fogli and Guerrieri (2019), while the empirical literature includes the works cited in footnote 1 as well as papers documenting increasing residential segregation by income in the US (Jargowsky 1996; Reardon and Bischoff 2011). This literature emphasizes the inequality and social mobility consequences of residential segregation, but it does not link employment and community relations. Our paper contributes to this literature by highlighting novel interactions and making new predictions regarding the relationship between labor market rents, organizational form, and community relations.

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 four elements of our full framework: informal favor-exchange in the workplace; outside alternatives to community interactions; firm size choice by managers; and long-term employment relationships. These are studied in Sections 3, 4, 5, and 6, respectively.

2.1 Model Preliminaries

The economy consists of a number $n \geq 2$ of identical firms and a continuum of mass 1 of identical workers. Each firm is associated with a single owner/manager and inelastically demands μ units of labor, where we assume that $n\mu < 1$, so labor supply exceeds demand. All agents (workers and managers) are infinitely lived and discount future payoffs with a common discount factor $\delta \in (0, 1)$.

7. These works build on prior papers documenting that managers prefer to pay workers well (Bertrand and Mullainathan 2003) and this preference is stronger when workers and managers are more closely connected geographically or within the organizational hierarchy (Cronqvist et al. 2009).

The economy alternates between (odd-numbered) *employment periods* and (even-numbered) *community periods*. In odd periods, workers and managers match to engage in a one-shot, bilateral employment relationship. Matching is uniformly random—so there is a spot labor market, where each worker finds employment with probability μ—except that each manager can "blacklist" any set of workers, which means that she will never match with them. Blacklisting will not occur along the equilibrium path of play, but the threat of being blacklisted can motivate workers.[8] Empirically, we can interpret a blacklisted worker as one whom firms literally refuse to hire, or alternatively as a worker who is in bad community standing and thus does not receive job tips or recommendations. The timing and payoffs in an employment relationship are described in the next subsection.

In even periods, each agent (worker or manager) chooses how much effort to exert in providing public goods. Each agent can also choose to "exclude" (at no cost) any set of agents from benefitting from her effort. Like blacklisting from employment, exclusion from community benefits will not occur along the equilibrium path. Importantly, the equilibrium level of public good provision will differ between workers and managers (and, in the extension considered in Section 6, between employed and unemployed workers).

An agent's overall payoff is the discounted sum of her payoffs in employment and community periods. As we assume that period 1 is an employment period, the total weights on employment and community payoffs are $1/(1+\delta)$ and $\delta/(1+\delta)$, respectively.

The model and equilibrium concept will end up being relatively simple, but 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 the equilibria of the model, and Section 2.8 presents comparative statics.

2.2 Employment Interactions: Timing and Payoffs

The timing of an employment interaction 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

8. The threat is credible because, since $n\mu < 1$, a manager who blacklists a zero-measure set of workers can still fill her available positions.

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

In sum, the manager's payoff from an employment interaction is

$$u_0^M = \mathbf{1}\{\text{worker works}\}\, y - \mathbf{1}\{\text{worker not caught shirking}\}\, w - \mathbf{1}\{\text{high monitoring}\}\, k,$$

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

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

We assume that a manager's payoff is additive across workers, and we restrict attention to equilibria where managers offer all workers the same contract, so a manager's total employment payoff (or firm profit) is $\mu^M = \mu u_0^M$.

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) will ensure that in the baseline model the profit of a tough manager is greater than that of a soft manager and is non-negative.

We also define the constant

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

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

Overall, an employment interaction is 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 chooses a community effort level $a \geq 0$ at a net private cost of a, and also decides whether to exclude any other agents from the benefits of her effort. The interpretation is that excluded agents are ostracized from community activities. In practice, community effort includes keeping the neighborhood clean and safe; participating in local civic or religious activities; sharing useful information; and providing informal favors or insurance.

We focus on symmetric equilibria where all workers choose the same effort level a^W and all managers choose the same effort level a^M. Since there is a continuum of workers, a deviation by a single worker does not affect the average effort level among workers. We thus formally define community benefits only for effort profiles $\mathbf{a} = \left(a^W, a^{M,1}, \ldots a^{M,n}\right)$ where all workers choose the same effort a^W, where $a^{M,i}$ is the effort of the manager of firm i, as

$$B(\mathbf{a}) = \alpha \times \left(b^W\left(a^W\right) + \sum_{i=1}^{n} b^M\left(a^{M,i}\right)\right). \tag{2}$$

Here, b^W and b^M are increasing and concave functions satisfying $b^W(0) = b^M(0) = 0$ and the Inada conditions $\lim_{a \to 0}\left(b^W\right)'(a) = \lim_{a \to 0}\left(b^M\right)'(a) = \infty$ and $\lim_{a \to \infty}\left(b^W\right)'(a) = \lim_{a \to \infty}\left(b^M\right)'(a) = 0$, and $\alpha > 0$ is a parameter measuring the importance of community benefits. The different functions b^W and b^M can capture different community tasks provided by workers and managers; they also differ in scale, as $b^W(a)$ is the benefit provided when *all* workers exert effort a, while $b^M(a)$ is the benefit when *one* manager exerts effort a. Managers do not benefit from their own community effort (meaning that the net private cost of effort a for a manager equals a): for each manager i, the community benefits she obtains at effort vector $\mathbf{a}$ are given by

$$B^{M,i}(\mathbf{a}) = B(\mathbf{a}) - \alpha b^M(a^{M,i}).$$

The total payoffs from community interactions for workers and managers are given by

$$V^W(\mathbf{a}) = B(\mathbf{a}) - a^W \quad \text{and} \quad V^{M,i}(\mathbf{a}) = B^{M,i}(\mathbf{a}) - a^{M,i} \quad \text{for all } i.$$

At a symmetric effort profile where all managers take the same effort level a^M, we simplify notation by writing

$$\begin{aligned} B\left(a^W, a^M\right) &= \alpha \times \left(b^W\left(a^W\right) + nb^M\left(a^M\right)\right), \\ B^M\left(a^W, a^M\right) &= \alpha \times \left(b^W\left(a^W\right) + (n-1)\, b^M\left(a^M\right)\right), \\ V^W\left(a^W, a^M\right) &= B\left(a^W, a^M\right) - a^W, \quad \text{and} \quad V^M\left(a^W, a^M\right) = B^M\left(a^W, a^M\right) - a^M. \end{aligned} \tag{3}$$

Overall, a community interaction is 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 actions taken in both settings. Our observability assumptions encode the view that information about community interactions and manager employment practices is well-publicized within communities, while individual workers' employment terms and outcomes are more private.

Specifically, we assume that all manager 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 the analysis, as otherwise wages could be influenced by repeated game considerations and hence would be largely indeterminate. In particular, the assumption that wages are unobserved ensures that managers set wages "myopically," subject to worker incentive constraints.[9]

For workers, we assume that only the community effort decision a is publicly observed. In particular, workplace effort and contract acceptance or rejection decisions are unobserved. This implies that a worker cannot be blacklisted by future employers or ostracized in the community for shirking in the workplace or for accepting or refusing employment.[10]

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 consider equilibria in *public strategies*, where all 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

9. Relaxing this assumption would imply that equilibria are no longer Pareto ranked due to a multiplicity of possible wages, so we would need to consider comparative statics separately for each Pareto weight on workers relative to managers.

10. 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 workers who work for blacklisted firms can themselves be blacklisted. 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—could be studied in future work.

wage offer. Thus, a public strategy for a manager specifies, as a function of the public history, (1) which workers (if any) to blacklist; (2) what contract (monitoring intensity and wage) to offer her workers; and (3) how much community effort to provide 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 shirk; and (2) how much community effort to provide and which agents to exclude. We also restrict attention to equilibria that are *symmetric*, meaning that all workers and all managers use the same strategy, and *stationary*, meaning that each agent takes the same action in every period along the equilibrium path of play.[11] A *perfect public equilibrium* is a profile of symmetric, stationary, public strategies that forms a Nash equilibrium starting from any public history.

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 $\left(a^W, a^M\right)$ are set to their maximum incentive compatible levels. We will see in Section 2.6 that all Pareto efficient perfect public equilibria lie in this class, provided that the discount factor δ is below a threshold $\bar{\delta}$.[12] Henceforth, we simply refer to a perfect public equilibrium in this class as an *equilibrium*. An equilibrium path is fully described by the prevailing management regime (soft or tough), the wage level w, and the community effort levels $\left(a^W, a^M\right)$. We call an equilibrium soft or tough after the prevailing regime.

We first derive incentives in employment interactions (which determine w as a function of the management regime), then analyze incentives in community interactions (which determine (a^W, 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 and $\left(a^W, a^M\right)$, and hence completely specifies the equilibrium).

To preview, an equilibrium will involve two 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 provide insufficient community benefits can be blacklisted. This mechanism reflects the fact (discussed in the Introduction) that workers rely on good community standing to obtain job recommendations.

11. Non-stationary equilibria can potentially improve on stationary ones in many repeated games (e.g., Abreu 1986). However, our objective is to characterize stable socioeconomic arrangements, which naturally suggests focusing on stationary equilibria.

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

2.5 Employment Interactions: Wages and Worker Incentives

Since wage offers are not publicly observed, the wage in each management regime is uniquely determined as the lowest wage that motivates the worker to work rather than shirk. We now characterize this wage and the resulting payoffs in each regime.

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

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

Worker and manager employment payoffs ("rents") are then given by, respectively,

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

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 profits 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:

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

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

2.6 Community Interactions: Incentives for Community Effort

A pair of community effort levels $\left(a^W, a^M\right)$ 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 provide 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 provide community effort a^M, she is excluded from all future community benefits. However, she can continue to hire workers and obtain profit Π_T^M.[13] Her continuation payoff is therefore 0 in even periods and Π_T^M in odd periods.

We can now derive the incentive constraints that determine the (component-wise) maximum equilibrium pair $\left(a^W, a^M\right)$ of community effort levels. For a worker, deviating from an effort level of a^W to 0 (the most profitable deviation) saves an effort cost of a^W but incurs an expected future utility loss of $n\mu\Pi^W$ in employment periods (as a worker finds employment with probability $n\mu$) and $V^W\left(a^W, a^M\right)$ in community periods, where $\Pi^W \in \{\Pi_S^W, \Pi_T^W\}$ depending on whether the equilibrium management regime is soft or tough. For a manager, deviating from an effort level of a^M to 0 saves an effort cost of a^M but incurs an expected future utility loss of $\mu\left(\Pi^M - \Pi_T^M\right)$ in employment periods and $V^M\left(a^W, a^M\right)$ in community periods, where $\Pi^M \in \{\Pi_S^M, \Pi_T^M\}$. In total, a pair of community effort levels (a^W, a^M) is *incentive compatible* if

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

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

The maximum in (5) is introduced because the first term on the right-hand side is negative in a soft equilibrium where $\Pi^M = \Pi_S^M < \Pi_T^M$.

When $\left(a^W, a^M\right)$ is maximized component-wise, (4) and (5) hold with equality.[14] Substi-

13. A deviant manager can still profitably hire workers because there are always available unemployed workers ($n\mu < 1$) and employment interactions are anonymous. 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.

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

tuting for $V^W\left(a^W, a^M\right)$ and $V^M\left(a^W, a^M\right)$ using (3) and rearranging gives

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

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

The logic of these equations is that if an agent is indifferent between taking some effort level a and shirking in each community period, then she is indifferent between shirking starting in the current period and starting in the next community period. Relative to shirking starting in the next community period, shirking starting in the current period saves an effort cost of a, but forgoes the next-period employment rent as well as the value of community benefits in the next community period. Equating these benefits and costs yields (6)–(7).

The following lemma says that there exists a component-wise largest pair $\left(a^W, a^M\right)$ that satisfies (6)–(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 by workers than managers. The proof (as well as all other proofs omitted from the text) is deferred to the appendix.

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)–(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 $\left(\tilde{a}^W, \tilde{a}^M\right)$.*

5. *Workers provide greater community effort than managers: $a^W \geq a^M$.*

The intuition for the first four parts of the lemma is that community effort choices are intertemporal strategic complements (each agent is willing to provide more effort today when others are expected to provide more effort in the future), and when $\delta < \bar{\delta}$ the maximum incentive compatible community effort levels are inefficiently low (each agent would like to commit to increase her own effort so as to induce more effort from others). As a result, $V^W\left(a^W, a^M\right)$ and $V^M\left(a^W, a^M\right)$ are both positive and increasing in each argument;

a component-wise maximal pair $\left(a^W, a^M\right)$ exists; and any incentive compatible pair of effort levels is Pareto dominated by the maximal one.[15] Note also that this is where we are using the assumption that there is more than one manager ($n \geq 2$), as with a single manager, $V^M\left(a^W, a^M\right)$ would equal $b^M\left(a^W\right) - a^M$ and hence would be decreasing in a^M.[16] We henceforth assume that $\delta < \bar{\delta}$.

The last part of the lemma follows because $\Pi^W \geq 0$ but $\Pi^M - \Pi^M_T \leq 0$. Intuitively, workers lose future employment rents if their community standing is damaged. In contrast, managers forgo employment rents in a soft equilibrium (because $\Pi^M_S < \Pi^M_T$, which implies that manager payoffs in employment periods are below their minmax payoff in these periods). As a result, manager profits or employment rents *rise* if they revert to static Nash play and the tough management regime.[17] Managers are willing to forgo these employment rents only if they are privileged in the community by exerting less effort. However, this comparison can be overturned once we introduce favor exchange in employment relations in Section 3, as then losing worker trust can reduce firm profits, so that managers as well as workers lose future employment rents if they lose community standing.

2.7 Equilibrium Characterization

We now determine the conditions under which soft and tough equilibria exist. 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. We have shown that a soft manager's equilibrium payoff, starting in an employment period, is $\left(\mu\Pi^M_S + \delta V^M_S\right)/(1+\delta)$, where $V^M_S = V^M\left(a^W_S, a^M_S\right)$ and $\left(a^W_S, a^M_S\right)$ is the maximum incentive compatible pair of community effort levels (i.e., the largest solution to (6)–(7), with $\Pi^W = \Pi^W_S$ and $\Pi^M = \Pi^M_S$). If a soft manager deviates to high monitoring, her payoff is $\mu\Pi^M_T/(1+\delta)$. Hence, this deviation is unprofitable if and only if

$$\mu\Pi^M_T \leq \mu\Pi^M_S + \delta V^M_S \quad \iff \quad \mu\left(\rho - k\right) \leq \delta V^M_S. \tag{8}$$

15. A similar lattice structure, where the maximum incentive compatible effort levels for each of two groups form a Pareto optimal equilibrium, is also present in Acemoglu and Wolitzky (2020, 2021).

16. This logic also reveals that our analysis readily extends to the case where labor demand μ is heterogeneous across firms, so long as there are at least two firms with each level of labor demand. We assumed all firms to have the same size to simplify the exposition.

17. Another force pushing in the same direction is that managers do not benefit from their own effort, so that $B^{M,i}\left(a^W, a^M\right) \leq B\left(a^W, a^M\right)$.

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

The next lemma shows that this condition can be rewritten in a slightly simpler form, which replaces the term $V_S^M = B^M(a_S^W, a_S^M) - a_S^M$ in (8) with $B^M(a_S^W, a_S^M)$ alone.

Lemma 2 *A soft equilibrium exists if and only if*

$$\mu(\rho - k) \leq \delta B^M(a_S^W, a_S^M). \tag{9}$$

Proof. By (5), if $a_S^M > 0$ then $(1 - \delta^2) a_S^M + \delta\mu(\rho - k) \leq \delta^2 V_S^M$, and hence $\mu(\rho - k) \leq \delta V_S^M$. Thus, a soft equilibrium exists if and only if (8) holds when $a_S^M = 0$, in which case $V_S^M = B^M(a_S^W, a_S^M)$. ■

Thus, a soft equilibrium exists if and only if the difference in profits between tough and soft management is less that δ times the value of community benefits.

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

$$\Pi_S^i + \delta V_S^i \geq \Pi_T^i + \delta V_T^i. \tag{10}$$

Since community effort levels can be higher in a soft equilibrium (due to workers' higher employment rents), this condition is satisfied for many parameters, in which case the tough equilibrium is Pareto dominated. This Pareto inefficiency is due to a *tough management externality*: when a manager introduces intensive monitoring, this reduces worker rents and thus worker community effort, which reduces welfare for all other managers and workers.[18]

An illustrative case where the soft equilibrium is Pareto dominant arises when k is only slightly below ρ, so that Π_S^M is only slightly below Π_T^M. Then, manager profits are slightly lower in a soft equilibrium (i.e., lower by $\mu(\rho - k) \approx 0$), while worker employment rents

18. While the tough management externality is present in our baseline model, a subtlety is that it cannot unravel the soft equilibrium when the soft equilibrium is Pareto dominant. To see this, note that managers are better-off in the soft equilibrium regime if and only if $\mu(\rho - k) \leq \delta(V_S^M - V_T^{M,i})$. Since $V_T^M \geq 0$, this inequality is harder to satisfy than (8). Thus, if managers are better-off in the soft equilibrium regime, they do not have a profitable deviation. In contrast, once we introduce workplace favor exchange in Section 3, the tough management externality can destroy the soft equilibrium even when it is Pareto dominant.

are considerably higher (i.e., higher by $\rho > 0$). By equations (6)–(7), this implies that community effort levels and benefits are considerably higher in a soft equilibrium. These benefits more than offset managers' slightly lower profits, leaving all agents better off.

The following proposition summarizes these results.

Proposition 1

1. *A tough equilibrium always exists.*

2. *A soft equilibrium exists if and only if* $\mu(\rho - k) \leq \delta B\left(a_S^W, a_S^M\right)$, *where* $\left(a_S^W, a_S^M\right)$ *is the largest solution to* (6)–(7) *when* $\Pi^W = \Pi_S^W$ *and* $\Pi^M = \Pi_S^M$.

3. *There exists* $k^* < \rho$ *such that the soft equilibrium Pareto dominates the tough equilibrium whenever* $k \in (k^*, \rho)$ *(even though managers make higher profits in the tough equilibrium).*

4. *If* (10) *holds for both workers and managers (so that, if the soft equilibrium exists, it is Pareto dominant—see footnote 18), then the soft equilibrium exists.*

2.8 Comparative Statics

We now give some simple comparative statics for the conditions under which the soft equilibrium exists and for welfare in the soft equilibrium. We say that the soft equilibrium is "favored" by an increase in a 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. The conditions for the existence of a soft equilibrium do not depend on* y. *Moreover, in a soft equilibrium all agents' utilities are increasing in* α *and* k *and are decreasing in* q.

Thus, 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.[19] These results are all intuitive once we recall that a soft equilibrium exists if and only if it is unprofitable for a manager to

19. The effect of an increase in p for a fixed effort cost c is ambiguous, because this may decrease a_S^W via (6) and hence decrease $B(a_S^W, a_S^M)$. The effect of an increase in μ is also ambiguous, as this increases worker rents (and hence community effort) but also managers' gains from intensive monitoring.

deviate by adopting intensive monitoring, at the cost of exclusion from future community benefits. Finally, the welfare comparative statics for k and q work through the incentive constraints that determine the maximum community effort levels, (6)–(7). Namely, making intensive monitoring more costly or less accurate increases welfare in a soft equilibrium, because it makes deviating to intensive monitoring less attractive for managers, and hence increases the maximum incentive compatible community effort levels in a soft equilibrium.

3 Workplace Favor Exchange

In this section, we introduce another key element of our full model—favor exchange between managers and workers—which allows for a more efficient way of transferring a limited amount of employment rents from managers to workers based on mutual trust. The model with favor exchange generates additional predictions and shows how various technological and other factors can destroy the soft equilibrium even when it is Pareto dominant.

3.1 Introducing Favor Exchange

We now introduce favor exchange in employment. We assume that an employment interaction 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 whether to do a favor is publicly observed.

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

Favors can capture workplace amenities, flexibility in job requirements, 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. However, 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 allows us to make three new points:[20]

20. 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).

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

$$\tau = \rho - k - d + e \geq 0. \tag{11}$$

If $\tau < 0$ then manager profits are higher in the soft regime. This can also lead manager community effort to exceed worker community effort, as now the threat of losing workers' trust that a manager will provide workplace favors can motivate managers to provide higher community effort.

However, there is now a new constraint on the existence of a soft equilibrium: providing favors must be credible for managers. This constraint drives a wedge between managers' preferences between the soft and tough regimes and the conditions for the soft equilibrium to exist. Consequently, the tough management externality can now undermine the soft equilibrium even when this equilibrium would have been Pareto dominant had it existed (in contrast to Proposition 1.4, which shows that this cannot happen in the baseline model). We next preview the new results of the model with favor exchange, before presenting the equilibrium characterization and comparative static results more formally.

New comparative statics: Because the tough management externality can now undermine the soft equilibrium even when it is Pareto dominant, 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. In contrast, recall that in the baseline model the soft equilibrium can Pareto dominate the tough equilibrium and the same parameter changes can destroy the soft equilibrium, but by Proposition 1.4 these two things cannot happen at the same time.

Tough-but-fair management: There is now a third management regime, where the manager chooses high monitoring but also does favors for workers who are not caught shirking. This regime can capture management practices that combine intensive monitoring with "fair" treatment of workers. This regime is reminiscent of, for example, early twentieth-century management models such as "Taylorism" (associated with Frederick Winslow Taylor) or "Fordism" (associated with Henry Ford).

3.2 Equilibrium Characterization

We characterize when soft and tough-but-fair equilibria exist. (As in Section 2, a tough equilibrium always exists.) To simplify the analysis, we assume that

$$y - \frac{c}{p} \leq 0, \tag{12}$$

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

Soft equilibrium: A worker's expected payoff in a soft equilibrium is now $w + d - c$ if he works and $(1-p)(w+d)$ if he shirks, so the lowest wage that induces effort is

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

and employment rents and surplus are given by

$$\Pi_S^W = w + d - c = \frac{1-p}{p}c, \qquad \Pi_S^M = y - \frac{c}{p} + d - e, \qquad \text{and} \qquad \bar{\Pi}_S = y - c + d - e.$$[21]

In contrast, the equations for Π_T^W and Π_T^M remain unchanged, as managers do not do favors in a tough equilibrium.

Next, a soft equilibrium exists if and only if it is unprofitable for a soft manager to deviate by choosing high monitoring or by reneging on expected workplace favors. Recall that a soft manager's equilibrium payoff starting in an employment period is $\left(\mu\Pi_S^M + \delta V_S^M\left(a_S^W, a_S^M\right)\right)/(1+\delta)$, where $\left(a_S^W, a_S^M\right)$ is given by (6)–(7) with the new (higher) value for Π_S^M. If a soft manager deviates to high monitoring, it is without loss to specify that the current worker does not trust the manager to do a favor, so the manager's future profit is $\mu\Pi_T^M/(1+\delta)$. Hence, this deviation is unprofitable if and only if

$$\mu\Pi_T^M \leq \mu\Pi_S^M + \delta V_S^M \quad \Longleftrightarrow \quad \mu\left(\rho - k - d + e\right) \leq \delta V_S^M. \tag{13}$$

In contrast, if a soft manager chooses low monitoring but deviates by reneging on workplace favors, her payoff is

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

21. The equation $w = c/p - d$ relies on our restriction to public equilibrium strategies, where (in particular) managers do not condition the decision to do a favor on the current-period wage (which is sunk at the time of the favor decision). Without this restriction, higher wages could be sustained by the belief that a manager who cuts wages will not provide a favor.

So this deviation is unprofitable if and only if

$$\left(1-\delta^2\right)\mu\left(\Pi_S^M+e\right)+\delta^2\mu\Pi_T^M \leq \mu\Pi_S^M+\delta V_S^M \quad \Longleftrightarrow \quad \mu\left(\delta^2\left(\rho-k-d\right)+e\right)\leq \delta V_S^M. \tag{14}$$

In total, we see that both (13) and (14) hold—so a soft equilibrium exists—if and only if

$$\mu\left(e+\max\left\{\rho-k-d,\delta^2\left(\rho-k-d\right)\right\}\right)\leq \delta V_S^M. \tag{15}$$

As in Section 2.7, this characterization can be rewritten in a simpler form.

Lemma 3 *A soft equilibrium exists if and only if*

$$\mu\max\left\{\tau,e\right\}\leq \delta B^M\left(a_S^W,a_S^M\right). \tag{16}$$

Lemma 3 says that a soft equilibrium exists if and only if both the difference in profits between tough and soft management and the cost of doing favors are less than δ times the value of community benefits. The logic is that if the difference in profits $\mu\tau$ exceeds $\delta B^M\left(a_S^W,a_S^M\right)$ then a manager will deviate to tough management at the beginning of an employment period, while if the cost of doing favors μe exceeds $\delta B^M\left(a_S^W,a_S^M\right)$ then a manager will deviate by reneging on favors at the end of an employment period.

We also note that if $\tau>0$ then $a^W\geq a^M$ as in Section 2. However, if $\tau<0$—so that $\Pi_S^M>\Pi_T^M$—then this ordering can be reversed. The logic is that if $\tau<0$ then soft managers make higher profits than tough ones by monetizing favors, so the threat of losing workers' trust that managers will deliver favors can motivate managers to provide community effort.

Tough-but-fair equilibrium: In a tough-but-fair equilibrium, 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 effort is thus

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

and employment rents and surplus are given by

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

Without loss, a tough-but-fair manager cannot gain by deviating to low monitoring, because we can specify that 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

$$\frac{1-\delta^2}{1+\delta}\mu\left(\Pi_{TF}^{M}+e\right)+\frac{\delta^2}{1+\delta}\mu\Pi_{T}^{M}.$$

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

$$\begin{aligned}\left(1-\delta^2\right)\mu\left(\Pi_{TF}^{M}+e\right)+\delta^2\mu\Pi_{T}^{M} &\leq \mu\Pi_{TF}^{M}+\delta V_{TF}^{M} \quad\iff\\ \mu\left(e-\delta^2 d\right) &\leq \delta V_{TF}^{M}. \end{aligned} \tag{17}$$

The interpretation of (17) is that a manager who starts reneging on workplace favors saves a per-worker cost of e in every employment period but loses a per-worker value of d starting in the next employment period.

The next lemma simplifies this condition, in the same manner that Lemma 3 did for the soft equilibrium (and its proof is entirely analogous and is omitted).

Lemma 4 *A tough-but-fair equilibrium exists if and only if*

$$\mu e \leq \delta B^{M}\left(a_{TF}^{W},a_{TF}^{M}\right). \tag{18}$$

The following proposition—which generalizes Propositions 1 and 2 to the model with workplace favor exchange—summarizes the above analysis and presents some basic comparative statics.

Proposition 3

1. *A tough equilibrium always exists. A soft equilibrium exists if and only if* $\mu\max\{\tau,e\}\leq\delta B^{M}\left(a_{S}^{W},a_{S}^{M}\right)$*, where* $\left(a_{S}^{W},a_{S}^{M}\right)$ *is the largest solution to* (6)–(7) *when* $\Pi^{W}=\Pi_{S}^{W}$ *and* $\Pi^{M}=\Pi_{S}^{M}$*. A tough-but-fair equilibrium exists if and only if* $\mu e\leq\delta B^{M}\left(a_{TF}^{W},a_{TF}^{M}\right)$*, where* $\left(a_{TF}^{W},a_{TF}^{M}\right)$ *is the largest solution to* (6)–(7) *when* $\Pi^{W}=\Pi_{TF}^{W}$ *and* $\Pi^{M}=\Pi_{TF}^{M}$*.*

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*. 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. The conditions for the existence of a tough-but-fair equilibrium do not depend on y, k, or p.*

3.3 Comparative Statics

We now turn to a key comparative statics result, which shows that parameter changes that undermine the existence of a soft equilibrium or reduce workers' employment rents in a given management regime can reduce welfare for managers as well as 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 consider improvements in the intensive monitoring technology (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 imposing a minimum wage can only reduce total welfare (by possibly raising the wage above managers' willingness to pay). However, these standard results can be overturned once we account for the interplay between employment and community interactions.

Proposition 4

1. *Making intensive monitoring more accurate or less costly to adopt (increasing q or decreasing k) can reduce both welfare and employment rents for both workers and managers by destroying the soft equilibrium.*

2. *Imposing a minimum wage (a lower bound on w) can increase both welfare and employment rents for both workers and managers by supporting a soft equilibrium where it did not previously exist.*

Proof. Since the result asserts a possibility, it suffices to give explicit numerical examples. These are included in the working paper version of this paper (Acemoglu and Wolitzky, 2024). Numerical examples for additional possibility results below may likewise be found in the working paper. ∎

The intuition for the first result is that increasing q or decreasing k can destroy the soft equilibrium by making intensive monitoring more attractive (as in Proposition 2), which can reduce everyone's welfare (as in Proposition 1.3), as well as reducing firm profits by undermining workplace favor exchange. The intuition for the second result is that a manager whose ability to cut wages is constrained following a deviation to intensive monitoring gains less from this deviation, so introducing a minimum wage can stabilize the soft equilibrium, which can increase welfare as well as firm profits (again by facilitating workplace favor exchange). Both of these results are reminiscent of patterns documented by Gordon (1996), who linked the rise in workplace monitoring (and what he called "the stick strategy") to social and community decline and to lower real wages.

We next turn to the effects of labor-saving technological or organizational changes such as automation, outsourcing, or offshoring. We model these phenomena in a reduced-form manner as a reduction in labor demand μ. The logic of this 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 firms outside the community (outsourcing) or in other countries (offshoring). We again find that this apparently efficiency-enhancing change can reduce everyone's welfare as well as firm profits, by reducing worker employment rents and thereby reducing community effort and undermining the soft equilibrium.

Proposition 5 *A reduction in μ due to automation, outsourcing, or offshoring can reduce both welfare and employment rents for both workers and managers by destroying the soft equilibrium.*

Proposition 5 can help explain the negative effects that automation, outsourcing, and offshoring can have on local communities by eliminating high-wage jobs. In line with this interpretation, automation appears to have played a role in the Hormel case mentioned in the Introduction. Hormel CEO Richard Knowlton 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). Knowlton's approach followed the contemporary practices of other companies in the meat-packing industry, but Hormel was much more intertwined with its local community than were its peers in major metropolitan areas. Hormel's automation efforts therefore faced greater community resistance and had more far-reaching consequences for local community life.

It is also worth noting that the comparative static in Proposition 5 can also go the opposite way: automation, outsourcing, or offshoring can sometimes stabilize the soft equilibrium, because, by reducing worker rents, it reduces managers' incentives to deviate to intensive monitoring to shift these rents to themselves (i.e., by reducing the left-hand side of (16)). Through this mechanism, automation, outsourcing, or offshoring can even increase community effort.[22]

22. It is also possible to read the history of Hormel as more in line with this result. Knowlton was from Austin and was heavily involved in local philanthropy and community activities. He argued that modernizing manufacturing (partial automation) was essential for keeping jobs in Austin. For Knowlton's perspective, see Knowlton (2010).

Overall, our results show that when employment relationships are socially embedded, a full evaluation of technological or organizational changes 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, reduced restrictions on employment contracts, or automation, outsourcing, or offshoring—can undermine community cooperation and ultimately reduce all agents' welfare as well as firm profits. In the next two sections, we will see that improved alternatives to community interactions and increases in overall productivity can have similar adverse effects.

4 Opting Out of Community Interactions

We now partially endogenize community structure by letting individuals opt out of community interactions. This "opting out" can capture a range of ways in which individuals can separate themselves from the local community, including residential segregation, remote work, or turning to market-provided alternatives to traditionally community-based services, such as private schooling.

Formally, we now assume that at the beginning of each community period, each agent can opt out of the community interaction. If an agent opts out, she no longer provides community effort or receives community benefits, and she 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 interactions.

The presence of outside alternatives to community interactions can affect equilibrium behavior in one of two ways. First, some agents may opt out of the community in equilibrium. 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)–(7), are replaced by:[23]

$$a^W = \max\left\{\delta n\mu\Pi^W + \min\left\{B\left(a^W, a^M\right) - \gamma^W, \delta^2\left(B\left(a^W, a^M\right) - \gamma^W\right)\right\}, 0\right\}, \tag{19}$$

$$a^M = \max\left\{\delta\mu\left(\Pi^M - \Pi^M_T\right) + \min\left\{B^M\left(a^W, a^M\right) - \gamma^M, \delta^2\left(B^M\left(a^W, a^M\right) - \gamma^M\right)\right\}, 0\right\}. \tag{20}$$

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

23. To see this, note that (for example) a worker prefers to participate in the community rather than opting out iff $a^W \leq \delta n\mu\Pi^W + B\left(a^W, a^M\right) - \gamma^W$, and he prefers to exert effort in the community iff $a^W \leq \delta n\mu\Pi^W + \delta^2\left(B\left(a^W, a^M\right) - \gamma^W\right)$, and the highest value of a^W that satisfies both inequalities is given by (19).

(19)–(20) must satisfy

$$a^W \leq \delta n \mu \Pi^W + B\left(a^W, a^M\right) - \gamma^W, \qquad \text{and} \tag{21}$$
$$a^M \leq \delta \mu \left(\Pi^M - \Pi_T^M\right) + B\left(a^W, a^M\right) - \gamma^M. \tag{22}$$

Note that (21)–(22) always hold when (a^W, a^M) is strictly positive, but may be violated when some effort level equals zero. In addition, the incentive compatibility constraints for managers to provide favors, (16) and (18), are replaced by

$$\mu \max\{\tau, e\} \leq \delta\left(B\left(a_S^W, a_S^M\right) - \gamma^M\right) \qquad \text{and} \tag{23}$$
$$\mu e \leq \delta\left(B\left(a_{TF}^W, a_{TF}^M\right) - \gamma^M\right). \tag{24}$$

Equations (19)–(24) characterize equilibria where all agents participate in the community. In the alternative case where one of (21)–(22) is violated, at least one type of agent opts out of community interactions in equilibrium. Observe that if only one group (say, managers) opts out, then community effort for the other group (workers) is again given by (19)–(24), but now with $a^M = 0$. Additionally, if managers opt out, then 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 next proposition summarizes the effects of outside options.

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. If one group takes their outside option in equilibrium, the other group is left worse off.*

2. *Increasing either group's outside option shrinks the parameter range for which a soft or tough-but-fair equilibrium exists.*

Proposition 6.1 is a version of the standard result that improving outside options can reduce trust in relationships.[24] This comparative static can reflect societal trends such as improvements in communication technologies that make it easier for the rich to segregate

24. Earlier results along these lines were obtained by Arnott and Stiglitz (1991), Baker, Gibbons, and Murphy (1994), Kranton (1996), and Ghosh and Ray (1996), among others.

themselves in small enclaves, or improvements in transportation that give the rich access to a wider range of market goods and services. 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 discontinuously. However, further increases in γ^M raise total welfare, as this benefits managers and has no effect on workers.

Proposition 6.2 shows that improving outside options tends to shift the equilibrium employment regime from soft or tough-but-fair to tough (in addition to 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 the tough management regime. This finding and intuition are consistent with the evidence in Daniele Amore, Bennedsen, and Larsen (2022), discussed in the Introduction: Danish firms with locally-residing CEOs and with CEOs whose children attend the same school as those of employees have higher employee satisfaction. The Anchor Hocking case from the Introduction is also consistent with this result: Alexander (2017) reports that many Lancaster residents believed that the Newell Corporation, which later took over the company, instructed managers not to live in Lancaster,[25] because they would not adopt painful cost-cutting measures if they were heavily involved in the community.[26]

5 Productivity and Endogenous Firm Size

We next endogenize firm size. This extension lets us analyze how changes in productivity affect firm size, the equilibrium management regime, and the distribution of rents.

We assume that at the beginning of each period, each manager i chooses a measure μ_i of workers to match with. Assume that there is an upper bound $\bar{\mu}$ on μ_i satisfying $n\bar{\mu} < 1$, so that each manager can achieve her desired firm size and there are always some unemployed workers. For simplicity, we also assume throughout this section that γ^M is sufficiently high that all managers opt out of community interactions in equilibrium.[27]

25. There is no evidence that Newell Corporation actually did this, but the residents' concern reflects the logic of our result. Regardless of Newell's intent, Anchor Hocking had five CEOs in the 82 years prior to Newell's takeover in 1987, all of whom lived in Lancaster, but then had six CEOs between 1987 and 2004, none of whom lived there (Alexander 2017, p. 68).

26. We also note that a similar comparative static would arise if we separately parameterized workers' and managers' preference weights on community benefits in our baseline model and considered a reduction in managers' weight. This can be interpreted as a shift from local owner-management to external management (e.g., by venture capital), and it tends to undermine the soft equilibrium (similar to the α comparative static in Proposition 2).

27. This simplifying assumption eliminates potentially offsetting effects coming through the impact of

The model is otherwise unchanged from the previous section. A manager's utility in an employment interaction is now

$$\Pi^M = \theta g(\#\text{workers who work}) - (\#\text{workers not caught shirking})\, w$$
$$-e(\#\text{favors done}) - \mathbf{1}\{\text{high monitoring}\}\, k(\mu),$$

where $\theta > 0$ is a (Hicks-neutral) productivity parameter, g is a concave production function satisfying $\lim_{\mu\to\infty} g(\mu) = \infty$ and $\lim_{\mu\to\infty} g'(\mu) = 0$, and the # symbol refers to a measure of workers. In addition, $e(\mu)$ and $k(\mu)$ now represent, respectively, the cost of carrying out favors for μ workers and the cost of intensive monitoring when the manager employs μ workers. We also restrict a manager to using the same monitoring intensity for all workers.

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

productivity on managers' values of community interactions. It also makes the observability of a manager's choice of labor μ_i immaterial. Without it, the analysis would differ depending on whether or not μ_i is observable.

To see the intuition, consider the case with diseconomies of scale in favor exchange and economies of scale in monitoring. When productivity increases, the manager hires more workers, which makes favor exchange more costly and makes intensive monitoring less costly. This undermines the soft equilibrium. Moreover, as in the baseline model, adopting tough employment imposes a negative externality by reducing community effort. Thus, 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 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.[28]

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 productivity raises labor demand μ, which increases workers' probability of finding employment $n\mu$, and thus increases their employment rent $n\mu\Pi^W$. 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 (via higher likelihood of employment and greater worker rents) is also reminiscent of narratives proposed by Wilson (1996), Putnam (2000), and Murray (2012), among others.

6 Long-Term Employment

Finally, we consider long-term employment in the context of the baseline model of Section 2.[29] This introduces a distinction between currently-employed and unemployed worker in community periods. A key new result is that employed workers contribute more to the community than unemployed workers. This version of the model is also a better match for the "company towns" discussed in the Introduction and leads to new comparative statics.

The job matching technology is now as follows. In the first employment period (period 1), a mass μ of workers are randomly assigned to each firm, with the remaining $1 - \mu$

28. Suggestive empirical evidence in favor of this assumption comes from Guiso, Sapienza, and Zingales (2015), who find that firm performance is higher when workers view top managers as trustworthy, and that this trust is harder to sustain in public firms. This is consistent with the idea that managers earn higher profits by monetizing favors in a soft equilibrium, but that trust is harder to sustain in larger, more productive firms.

29. This is for simplicity. In principle, long-term employment could be considered alongside workplace favor exchange and our other model extensions.

workers being unemployed. At the start of each subsequent employment period, a worker remains employed with her current firm with probability ϕ and separates (exogenously) with probability $1 - \phi$. (The baseline model with a spot labor market is the case where $\phi = 0$.) This results in a pool of $1 - \phi n\mu$ unemployed workers and $(1 - \phi)\, n\mu$ newly available jobs, which are immediately filled by random unemployed workers. Thus, at the end of each employment period, $n\mu$ workers are employed and $1 - n\mu$ workers are unemployed; and unemployed workers expect to be employed in the next employment period with probability

$$\frac{(1 - \phi)\, n\mu}{1 - \phi n\mu} \equiv \kappa^U, \tag{25}$$

while employed workers expect to be employed in the next employment period (either at their current firm or a new one) with probability

$$\phi + (1 - \phi)\, \kappa^U = \frac{\phi + n\mu - 2\phi n\mu}{1 - \phi n\mu} \equiv \kappa^E. \tag{26}$$

Note that the probabilities satisfy: $\kappa^U \leq \kappa^E$ (currently employed workers are more likely to be employed in the future); κ^U and κ^E are both increasing in labor demand μ; and κ^U is decreasing in the retention rate ϕ, while κ^E is increasing in ϕ. (If $\phi = 0$ we recover the baseline model with a spot labor market where $\kappa^U = \kappa^E = n\mu$; and if $\phi = 1$ we have a labor market with long-term employment with no on-path separations, where $\kappa^U = 0$ and $\kappa^E = 1$.) We assume that a worker's current employment status is observable in community periods.

The rest of the model is the same as in Section 2, and we continue to focus on symmetric, stationary equilibria with maximum incentive-compatible community effort.[30]

The key implication of long-term employment for our model is that the community effort level is now different between currently-employed and unemployed workers. In particular, in the maximum effort equilibrium, continuation payoffs starting in a community period are $(1 - \delta)B(\mathbf{a})$ for both employed and unemployed workers, as all workers are indifferent between providing their prescribed community effort level and shirking in the community. This implies that, in employment periods, workers continue to be motivated solely by wages (as in the baseline model) rather than the threat of firing, so worker employment rents are unchanged from the baseline model.[31]

30. In equilibria with inefficiently low community effort, continuation payoffs for employed and unemployed workers can differ, which would affect wages and hence the distribution of employment rents. It is unclear if such equilibria could Pareto dominate the maximum effort equilibria we focus on. Such equilibria can be considered in a further extension of our analysis.

31. This point is a difference between our model and efficiency wage models a la Shapiro and Stiglitz (1984), where employed workers have higher continuation payoffs than unemployed workers.

In symmetric stationary equilibria, all $n\mu$ employed workers choose one effort level a^E and all $1 - n\mu$ unemployed workers choose another effort level a^U. Community benefits are now given as a function of the profile of effort levels $\mathbf{a} = \left(a^E, a^U, a^{M,1}, \ldots, a^{M,n}\right)$ as

$$B(\mathbf{a}) = \alpha \times \left(n\mu b^W\left(a^E\right) + (1 - n\mu)\, b^W\left(a^U\right) + \sum_{i=1}^{n} b^M\left(a^{M,i}\right) \right). \tag{27}$$

We write this as $B\left(a^E, a^U, a^M\right)$ if all managers choose the same effort a^M, and we denote the community benefits enjoyed by a manager as $B^M\left(a^E, a^U, a^M\right) = \alpha \times \left(n\mu b^W\left(a^E\right) + (1 - n\mu)\, b^W\left(a^U\right) + (n-1) b^M\left(a^{M,i}\right)\right)$.

An argument similar to that leading to equations (6)–(7) in the baseline model shows that there exists a component-wise maximum vector of incentive compatible effort levels $\mathbf{a}$, which is given by the largest solution to the system of equations

$$a^E = \delta\kappa^E \Pi^W + \delta^2 B\left(a^E, a^U, a^M\right), \tag{28}$$

$$a^U = \delta\kappa^U \Pi^W + \delta^2 B\left(a^E, a^U, a^M\right), \quad \text{and} \tag{29}$$

$$a^M = \max\left\{\delta\mu\left(\Pi^M - \Pi_T^M\right) + \delta^2 B^M\left(a^E, a^U, a^M\right), 0\right\}. \tag{30}$$

The logic of these equations is similar to that of equations (6)–(7) in the baseline model: at the maximum incentive compatible effort profile, an employed worker (say) is indifferent between shirking starting in the current period and starting in the next community period, which gives equation (28). For example, in the case of a spot labor market as in the baseline model ($\phi = 0$), we have $\kappa^E = \kappa^U = n\mu$, and hence

$$a^E = a^U = \delta n\mu \Pi^W + \delta^2 B\left(a^E, a^U, a^M\right),$$

which recovers equation (6). In contrast, in the case with no on-path separations ($\phi = 1$), we have $\kappa^E = 1$ and $\kappa^U = 0$, and hence

$$a^E = \delta \Pi^W + \delta^2 B\left(a^E, a^U, a^M\right) \qquad \text{and} \qquad a^U = \delta^2 B\left(a^E, a^U, a^M\right),$$

so employed workers contribute more to the community. Indeed, since κ^E is always weakly greater than κ^U, we have the following general result.

Proposition 9 *With long-term employment, $a^E \geq a^U$, and employed workers contribute more to community effort than unemployed workers.*

Intuitively, if they shirk in the community, employed workers stand to lose more employment rents—including their long-term employment—than unemployed workers. This result again accords with narratives linking employment and community effort, including Wilson (1996), Putnam (2000), and Murray (2012). that employment loss in regional labor markets can lead to a significant loss of community cohesion and effort.

A final (perhaps counterintuitive) result is that, in either a soft or a tough equilibrium, higher worker turnover—that is, lower ϕ—increases welfare. The logic is that reducing ϕ equalizes the future labor market prospects of currently-employed and unemployed workers, which reduces community effort from employed workers and increases it for unemployed workers, and the latter effect dominates because of decreasing returns to community effort (concavity of b^W). This logic is different from that of Shapiro and Stiglitz (1984), where workers are motivated by the threat of firing, so fewer involuntary separations (higher ϕ) always strengthen incentives. In contrast, in our model, workers are motivated by a within-period contract, and the current result is driven by the effect of the distribution of employment rents on community effort together with decreasing returns to community effort.

Proposition 10 *In either a soft or a tough equilibrium, all agents' ex ante welfare is decreasing in ϕ.*

7 Conclusion

This paper develops a framework that views employment as socially embedded, as in Polanyi (1944), Thompson (1971), Granovetter (1985), and Solow (1990). In our model, employment is intertwined with community relations in a multi-activity contact framework. We study how community interactions influence employment and firms, and how employment, wages, and workplace behavior shape community relations. Inspired by evidence from case studies and empirical literature emphasizing the importance of work for community outcomes (Wilson 1996, Murray 2012), community cooperation depends on the rents that workers anticipate from future employment, as well as on managers' and business owners' anticipated profits. Workers' access to high-rent jobs is linked to their community standing (as in the literature on community-based job recommendations following Granovetter 1973). Moreover, community cooperation also encourages managers to adopt more worker-friendly practices, due to the threat of exclusion from the community if they adopt harsher policies.

These linkages lead to distinct community-employment equilibria. 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 show 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 future 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 tough equilibrium. 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 unravel the soft equilibrium. 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, when employment relations are embedded in communities, technological changes can have major indirect effects on labor market outcomes via their impact on community relations; and, conversely, social trends that impact communities also influence labor market and organizational dynamics.

We see several exciting areas for further empirical and theoretical research. First, our theoretical framework is amendable to various extensions, including introducing additional linkages between employment and community interactions (e.g., making wages or workers' workplace behavior observable to the community); modeling residential choice and community interactions in multiple neighborhoods; modeling technological changes such as automation in greater detail; studying the effects of labor and capital taxation on worker and manager incentives; explicitly modeling communication (e.g., job recommendations) within communities; introducing unionization and worker bargaining power (rather than assuming managers have all the bargaining power in workplaces, as in the current model); introducing additional dimensions of heterogeneity, such as ethnic diversity or social network structure within communities; and exploring the model with long-term employment in greater detail (e.g., analyzing equilibria with non-maximal or non-stationary community effort in this model). These and other directions can contribute to a deeper understanding of the interplay of employment and community interactions and their implications for contemporary socioeconomic trends.

Second, we have focused exclusively on the "good side" of communities: their role as venues for cooperation, local public good provision, and information sharing. In reality, community norms can also support discrimination against and exclusion of certain groups, as well as excessive informal taxation and incentives for conformity, in the extreme leading to what Acemoglu and Robinson (2019) refer to as the "cage of norms." An important next step is to incorporate such adverse aspects of community relations and investigate when more favorable employment outcomes support positive community norms and when they instead abet negative or discriminatory norms.

Third, our work also suggests new empirical directions. More work is needed to investigate the causal link between civic life and employment opportunities for workers and its relation to the mechanisms we highlight. The evidence in Wilson (1996), Black, McKinnish, and Sanders (2003), and Autor, Dorn, and Hanson (2019), among others, suggests that these mechanisms are plausible, but they remain to be empirically investigated. For instance, variables found to be correlated with social mobility, education, health, and other socioeconomic outcomes in these literatures may be proxying for labor market rents or how binding the outside options of different demographic groups are. Our results therefore push for empirical models where the causal effects of these variables are carefully controlled for. 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. Relatedly, 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; whether the predicted synergy between soft management and more cooperative community relations exists and can be quantified; and whether recent economic and social trends in the United States and other countries can be partially explained by shifts from a soft socioeconomic equilibrium to a tough one.

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

$$F\left(\hat{a}^W, \hat{a}^M\right) = \begin{pmatrix} \delta n \mu \Pi^W + \delta^2 B\left(\hat{a}^W, \hat{a}^M\right), \\ \max\left\{\delta\mu\left(\Pi^M - \Pi_T^M\right) + \delta^2 B^M\left(\hat{a}^W, \hat{a}^M\right), 0\right\} \end{pmatrix}.$$

This function is monotone as B and B^M are monotone. Moreover, by the Inada condition $\lim_{a\to\infty}\left(b^W\right)'(a) = \lim_{a\to\infty}\left(b^M\right)'(a) = 0$, there exists $\bar{a} > 0$ such that if $\left(\hat{a}^W, \hat{a}^M\right)$ satisfies $\max\left\{\hat{a}^W, \hat{a}^M\right\} > \bar{a}$, then $\max_i F_i\left(\hat{a}^W, \hat{a}^M\right) < \max\left\{\hat{a}^W, \hat{a}^M\right\}$. 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 each coordinate of $\left(\hat{a}^W, \hat{a}^M\right)$ and in Π^W, $\Pi^M - \Pi_T^M$, and δ. 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 coordinate of F is strictly increasing in each coordinate of $\left(\hat{a}^W, \hat{a}^M\right)$ and in Π^W and δ; and when $\hat{a}_i^M > 0$ for all i the second coordinate of F is strictly increasing in each coordinate of $\left(\hat{a}^W, \hat{a}^M\right)$ and in $\Pi^M - \Pi_T^M$ and δ. This implies that the first coordinate of the largest fixed point cannot remain constant when Π^W or δ increases, or when $\hat{a}_i^M > 0$ for all i and $\Pi^M - \Pi_T^M$ increases; and that the second coordinate 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 $\left(\hat{a}^W, \hat{a}^M\right) \to 0$ as $\delta \to 0$. By the Inada condition $\lim_{a \to 0} \left(b^W\right)' (a) = \lim_{a \to 0} \left(b^M\right)' (a) = \infty$, the derivatives of $V^W\left(\hat{a}^W, \hat{a}^M\right)$ and $V^M\left(\hat{a}^W, \hat{a}^M\right)$ for all i with respect to each argument of $\left(\hat{a}^W, \hat{a}^M\right)$ are all strictly positive when each coordinate of $\left(\hat{a}^W, \hat{a}^M\right)$ is sufficiently small. Hence, for sufficiently small δ, $V^W\left(\hat{a}^W, \hat{a}^M\right)$ and $V^{M,i}\left(\hat{a}^W, \hat{a}^M\right)$ are all strictly increasing in each argument of $\left(\hat{a}^W, \hat{a}^M\right)$. The claim follows since all incentive compatible pairs $\left(\hat{a}^W, \hat{a}^M\right)$ satisfy $\left(\hat{a}^W, \hat{a}^M\right) \leq \left(a^W, a^M\right)$, where $\left(a^W, a^M\right)$ is the pair defined in part 1.

As observed in the text, the fifth claim follows because $\Pi^W \geq 0 \geq \Pi^M - \Pi_T^M$.

Proof of Proposition 1

Parts 1, 2, and 4 are proved in the text. For part 3, note that if $k = \rho$ (contrary to inequality (1)), then (i) the soft equilibrium exists (by (9), which holds strictly as $V_S^M > 0$), (ii) manager profits are equal in the soft and tough equilibria, (iii) worker employment rents are strictly higher in the soft equilibrium, and (iv) community effort levels and payoffs are strictly higher in the soft equilibrium (by (i), (ii), Lemma 1.2–4, and $\delta < \bar{\delta}$), and hence both worker and manager welfare is strictly higher in the soft equilibrium. Next, manager profits and both worker and manager community effort levels are continuous in k, in both the soft and tough equilibrium (as follows from continuity of the function F defined in the proof of Lemma 1). Hence, there exists $k^* < \rho$ such that the soft equilibrium Pareto dominates the tough equilibrium whenever $k \in (k^*, \rho)$.

Proof of Proposition 2

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

Proof of Lemma 3

By (7), if $a_S^M \neq -\delta\mu\tau + \delta^2 B^M\left(a_S^W, a_S^M\right)$ then $a_S^M = 0 > -\delta\mu\tau + \delta^2 B\left(a_S^W, a_S^M\right)$, and hence $\mu\tau > \delta B\left(a_S^W, a_S^M\right) = \delta V_S^M$, so a soft equilibrium does not exist by (15). Thus, a soft equilibrium exists if and only if $a_S^M = -\delta\mu\tau + \delta^2 B^M\left(a_S^W, a_S^M\right)$ and (15) holds. Now, if $a_S^M = -\delta\mu\tau + \delta^2 B^M\left(a_S^W, a_S^M\right)$, then by (5) (which binds at $\left(a_S^W, a_S^M\right)$), $\left(1-\delta^2\right) B^M\left(a_S^W, a_S^M\right) + \delta\mu\tau = V_S^M$. Therefore, (15) holds if and only if

$$\begin{aligned} \mu\left(e + \max\left\{\rho - k - d, \delta^2\left(\rho - k - d\right)\right\}\right) &\leq \delta\left(1-\delta^2\right) B^M\left(a_S^W, a_S^M\right) + \delta^2\mu\left(\rho - k - d + e\right) \iff \\ \mu\left(e + \max\left\{\rho - k - d, 0\right\}\right) &\leq \delta B^M\left(a_S^W, a_S^M\right) \iff \\ \mu\max\left\{\tau, e\right\} &\leq \delta B^M\left(a_S^W, a_S^M\right). \end{aligned} \tag{31}$$

Conversely, (31) together with (7) implies that $a_S^M = -\delta\mu\tau + \delta^2 B^M\left(a_S^W, a_S^M\right)$. Thus, a soft equilibrium exists if and only if (31) holds.

Proof of Proposition 3

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

For the second part, consider a soft equilibrium. Substituting for Π_S^W, Π_S^M, and Π_T^M, we see that $\left(a_S^W, a_S^M\right)$ is the greatest fixed point of the function

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

Note that each coordinate of F is increasing in a^W, 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 coordinate is increasing in δ, but this holds because the derivative of $\delta\mu\left(d - e + k - \frac{q-p}{pq}c\right) + \delta^2 B^M\left(a^W, a^M\right)$ with respect to δ is $\mu\left(d - e + k - \frac{q-p}{pq}c\right) + 2\delta B^M\left(a^W, a^M\right)$, which is positive whenever $\delta\left(d - e + k - \frac{q-p}{pq}c\right) + \delta^2 B^M\left(a^W, a^M\right)$ is.) Hence, by Theorem 1 of Milgrom and Roberts (1994), each coordinate of $\left(a_S^W, a_S^M\right)$ is increasing in δ, α, k, and d, and decreasing in q and e. Next, since $B\left(a_S^W, a_S^M\right)$ and $B^M\left(a_S^W, a_S^M\right)$ are increasing in each coordinate of $\left(a_S^W, a_S^M\right)$, they are increasing in δ, α, k, and d, and decreasing in q and e. Thus, since (16) is easier to satisfy when $B\left(a_S^W, a_S^M\right)$, $B^M\left(a_S^W, a_S^M\right)$, δ, k, or d increases, or q or e decreases, we see that, in total, (16) is easier to satisfy when δ, α, k, or d increases, or q or e decreases. In addition, (16) does involve y. Since a soft equilibrium exists if and only if (16) holds, this establishes the 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 $B\left(a_S^W, a_S^M\right)$ and $B^M\left(a_S^W, a_S^M\right)$, 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 $\left(a_{TF}^W, a_{TF}^M\right)$ is the greatest fixed point of the function

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

Each coordinate of F is increasing in a^W, a^M, δ, α, c, and d, and decreasing in q and e. Therefore, each coordinate of $\left(a_{TF}^W, a_{TF}^M\right)$ is increasing in δ, α, c, and d, and decreasing in q and e. Thus, since (18) is easier to satisfy when $B\left(a_{TF}^W, a_{TF}^M\right)$, $B^M\left(a^W, a^M\right)$, δ, or d increases, or e decreases, we see that, in total, (18) is easier to satisfy when δ, α, c, or d increases, or q or e decreases. In addition, (18) does not involve y, k, or p. Since a soft equilibrium exists if and only if (18) 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 $B\left(a_{TF}^W, a_{TF}^M\right)$ and $B^M\left(a_S^W, a_S^M\right)$, and hence raise all agents' welfare in a tough-but-fair equilibrium.

Proof of Proposition 6

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

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

Since F is increasing in $\left(\hat{a}^W, \hat{a}^M\right)$ 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. It is also clear that if either group takes their outside option, this both directly reduces the other group's community payoff, and also further reduces this payoff by reducing the other group's maximum incentive compatible community effort level.

For the second claim, 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 (23) and (24) harder to satisfy, both by decreasing V^M and also (for γ^M) by making (23) and (24) harder to satisfy for any fixed value of V^M.

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 $\mu > 0$ such that

$$e(\mu) \leq \frac{\delta^2}{1-\delta^2}\left(\Pi_S^M(\theta,\mu) - \Pi_T^M(\theta)\right), \tag{32}$$

where

$$\Pi_T^M(\theta) = \max_\mu \Pi_T^M(\theta,\mu) = \max_\mu \theta g(\mu) - \frac{c}{q}\mu - k(\mu) \tag{33}$$

and

$$\Pi_S^M(\theta,\mu) = \theta g(\mu) - \left(\frac{c}{p} - d\right)\mu - e(\mu). \tag{34}$$

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

$$\hat{\Pi}_S^M(\theta) \geq \Pi_T^M(\theta), \tag{35}$$

where

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

Let $\mu_T(\theta) = \text{argmax}_\mu \Pi_T^M(\theta,\mu)$ and $\mu_S(\theta) = \text{argmax}_\mu \hat{\Pi}_S^M(\theta,\mu)$.

Lemma 5 *If $\mu_S(\theta) \leq \mu_T(\theta)$ and $\mu_S(\theta') \geq \mu_T(\theta')$ then $\theta \leq \theta'$.*

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

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

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

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

Combining these inequalities, we have

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

Since k' is increasing and e' is decreasing, we have $\mu \leq \mu'$. Finally, since $\mu_S(\theta)$ 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

$$\frac{\partial \hat{\Pi}_S^M\left(\tilde{\theta}, \mu_S\left(\tilde{\theta}\right)\right)}{\partial \tilde{\theta}} = \mu_S\left(\tilde{\theta}\right) \quad \text{and} \quad \frac{\partial \Pi_T^M\left(\tilde{\theta}, \mu_T\left(\tilde{\theta}\right)\right)}{\partial \tilde{\theta}} = \mu_T\left(\tilde{\theta}\right).$$

By the integral envelope theorem (Milgrom and Segal 2002),

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

By Lemma 5, there exists θ^* such that $\mu_S\left(\tilde{\theta}\right) - \mu_T\left(\tilde{\theta}\right) \geq 0$ if and only if $\tilde{\theta} \geq \theta^*$. Hence, there exists $\hat{\theta}$ such that (35) 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 $\Pi_S^M\left(\tilde{\theta}, \mu\right)$ is concave.)

Proof of Proposition 8

For the first part, from 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 $\mu_S(\theta)$. Note that total worker utility in employment periods is given by $\Pi^W \mu_S(\theta)$. Hence, worker employment utility—and hence worker community effort and worker utility in community interactions—is increasing in $\mu_S(\theta)$, and hence also in θ. Thus, an increase in productivity raises 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, an example is included in the working paper.

Proof of Proposition 10

Recalling that

$$\kappa^E = \frac{\phi + n\mu - 2\phi n\mu}{1 - \phi n\mu} \quad \text{and} \quad \kappa^U = \frac{(1-\phi)\, n\mu}{1 - \phi n\mu},$$

we calculate

$$\frac{\partial \kappa^E}{\partial \phi} = \chi\,(1 - n\mu) \quad \text{and} \quad \frac{\partial \kappa^U}{\partial \phi} = -\chi n\mu, \quad \text{where} \quad \chi = \frac{1 - n\mu}{(1 - \phi n\mu)^2} > 0.$$

By (28)–(30), we have

$$\begin{aligned}
\frac{da^E}{d\phi} &= \delta \frac{\partial \kappa^E}{\partial \phi}\Pi^W + \delta^2 \frac{dB\left(a^E, a^U, a^M\right)}{d\phi} = \delta\chi\,(1-n\mu) + \delta^2 \frac{dB\left(a^E, a^U, a^M\right)}{d\phi}, \\
\frac{da^U}{d\phi} &= \delta \frac{\partial \kappa^U}{\partial \phi}\Pi^W + \delta^2 \frac{dB\left(a^E, a^U, a^M\right)}{d\phi} = -\delta\chi n\mu + \delta^2 \frac{dB\left(a^E, a^U, a^M\right)}{d\phi}, \\
\frac{da^M}{d\phi} &= \delta^2 \frac{dB\left(a^E, a^U, a^M\right)}{d\phi} \mathbf{1}\left\{a^M > 0\right\}.
\end{aligned}$$

By the definition of B (equation (27)), we have

$$\begin{aligned}
& \frac{dB\left(a^E, a^U, a^M\right)}{d\phi} \\
= \;& n\mu\alpha \left(b^W\right)'\left(a^E\right) \frac{da^E}{d\phi} + (1-n\mu)\,\alpha \left(b^W\right)'\left(a^U\right) \frac{da^U}{d\phi} + n\alpha \left(b^M\right)'\left(a^M\right) \frac{da^M}{d\phi} \\
= \;& n\mu\alpha \left(b^W\right)'\left(a^E\right) \left(\delta\chi\,(1-n\mu) + \delta^2 \frac{dB\left(a^E, a^U, a^M\right)}{d\phi}\right) \\
& + (1-n\mu)\,\alpha \left(b^W\right)'\left(a^U\right) \left(-\delta\chi n\mu + \delta^2 \frac{dB\left(a^E, a^U, a^M\right)}{d\phi}\right) \\
& + n\alpha \left(b^M\right)'\left(a^M\right) \delta^2 \frac{dB\left(a^E, a^U, a^M\right)}{d\phi} \mathbf{1}\left\{a^M > 0\right\} \\
\leq \;& \alpha\delta^2 \frac{dB\left(a^E, a^U, a^M\right)}{d\phi} \left(n\mu \left(b^W\right)'\left(a^E\right) + (1-n\mu)\left(b^W\right)'\left(a^U\right) + n\left(b^M\right)'\left(a^M\right) \mathbf{1}\left\{a^M > 0\right\}\right),
\end{aligned}$$

because $a^E \geq a^U$ (as $\kappa^E \geq \kappa^U$) and $\left(b^W\right)'' < 0$. Next,

$$\alpha\delta^2 \left(n\mu \left(b^W\right)' \left(a^E\right) + (1 - n\mu) \left(b^W\right)' \left(a^U\right) + n \left(b^M\right)' \left(a^M\right) \mathbf{1} \left\{a^M > 0\right\} \right) \leq 1,$$

as otherwise $\left(a^E, a^U, a^M\right)$ can be increased without violating (28)–(30). Since $\left(b^W\right)' > 0$ and $\left(b^M\right)' > 0$, We thus have $dB\left(a^E, a^U, a^M\right)/d\phi \leq C dB\left(a^E, a^U, a^M\right)/d\phi$ for some positive constant $C < 1$, which implies that $dB\left(a^E, a^U, a^M\right)/d\phi \leq 0$. When $\delta < \bar{\delta}$, this implies that payoffs in community interactions are decreasing in ϕ. Since ex ante expected payoffs in employment interactions are independent of ϕ, the result follows.