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Why Are There Strikes?

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Why Are There Strikes?

Abstract

Strikes, just as other types of conflict, used to be difficult to explain from an economic perspective. Initially, it was thought that they were a result of mistakes or irrationality. Then, during the 1980s an explosion of research brought asymmetric information to prominence as a significant cause of strikes. After reviewing such long-standing potential explanations, we go over some more recent ones. When a strike changes the future strategic positions of unions relative to firms compared to a bargain, then a strike can ensue; significantly, the more important the future is considered to be (i.e., the higher is the discount factor), the more likely a strike is. In a new model we show how solidarity based on identification with the union can lead to strikes. Additionally, power asymmetries, reputation-building, and internal union politics can account for strikes within a rational-choice, economic perspective.

JEL-Codes: J520, J530, C780, D740.

Keywords: unions, strikes, dispute resolution, bargaining.

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1 Introduction

Unions and strikes may seem to be past their prime in the West. There has been, however, an uptick of strikes in the US recently[1] and, among other countries, France has always had its share of contentious politics that often manifests itself in strikes. The decline of strikes, therefore, might be just a temporary part of a longer cycle. They could well come back, perhaps as part of a revival of union strength and a reduction of inequality.

To the extent that strikes lead to the loss of production and income, they might appear to be puzzling from a narrow economic viewpoint. In this paper we provide a selective overview on why strikes might occur, still largely through a rational-choice, economic perspective. We review some older literatures, such as those that rely on bargaining under incomplete information, and discuss some more recent developments in strike theory and empirical support. Admittedly, we are at risk of repeating others' summaries of strike theory from the 1990s, however a discussion of the current frontier is not possible without some amount of recounting. Unlike earlier work, since strikes can be thought of as particular forms of conflict, we draw on the conflict literature and seek to adapt it to the peculiarities of strikes.[2]

We begin with mistakes and non-optimal behavior, the earliest explanations for strikes in economics. Whereas micro-theorists tend to overlook such explanations as perhaps "trivial," they still need to be seriously considered since such factors are undoubtedly influential in practice and cannot be dismissed out of hand.

Moreover, observationally it might be difficult to distinguish, say, an absence of common priors from a situation in which there is asymmetric information between the two parties in the presence of common priors. The former might result in what could be called a "mistake," whereas the latter might induce Bayes Nash equilibrium strategies. Such strategies form the second major approach to explaining strikes developed in the 1980s. In section 3 we review such models based on asymmetric information.

We then develop a simple model that illustrates a somewhat discordant finding: As the future becomes more important (i.e., as the discount factor increases) there is a higher likelihood of a strike. This stands in contrast to the ordinary folk-theorem based arguments in repeated games, whereby grim-trigger, history dependent strategies could bring about cooperation. We first show in a simplified model how a higher discount factor, by making the future more important, can induce strikes under complete information. The reason is that, in dynamic settings, strikes can change the distribution of power between a union and a firm well into the future in ways that bargained outcomes do not. Therefore, a strike can be an equilibrium outcome and is more likely to occur the higher is the discount factor. We also review models that yield strikes as a mechanism for enhancing one side's reputation for toughness.

[1] Economics Policy Institute (2020)

[2] Fearon (1995) and Skaperdas (2006) provide overviews on bargaining and conflict

Next, we review a number of models under complete information that can generate strikes as an equilibrium, starting with the alternating-offers bargaining game of Fernandez and Glazer (1991). We include some recent models that are not specific to strikes but to conflict more generally. Power asymmetries in terms of the legal and institutional framework is one of the possible sources of strikes that we discuss.

The economics literature has neglected the role of solidarity both in union formation and in strikes. We build on the literature on economics and identity (Akerlof and Kranton, 2000) and construct a simple model of union identity that takes account of psychological payoffs of workers and the role that solidarity can play. Solidarity enhances the probability of prevailing in a strike and a strike can increase the number of those who identify with the union. Thus, a strike can induce a bandwagon effect that increases the involvement of union workers as well as potentially make them better off materially.

Rounding out the theoretical approaches to strikes, we discuss internal union politics and the degree of centralization of union negotiations. One possibility is that union leaders can have extra-union political or social objectives that can induce strikes when the rank and file would not do so otherwise. Another possibility is that union leaders care about the size of their membership rather than the welfare of workers. Strikes that leaders would prefer but not the workers can occur in that case as well, especially when the union is weak. Finally, we review the limited literature on the how fragmentation vs centralization of unions might contribute to strikes.

We close with a brief overview of the empirical aspects of research on strikes

2 Mistakes and Non-optimal Behavior

In the early years of serious inquiry, economists viewed strikes as mistakes. John Hicks (1963) hypothesized that the "majority of actual strikes are doubtless the result of faulty negotiation" (146). A few useful models came out of this view. And although they are not rooted in formal rationalism, they still provide some insight into the patterns of behavior we see in industrial relations. We highlight two such models from the past, and discuss a new approach that shows how conflict can result from optimism rooted in risk attitudes.

To hurdle Hicks' paradox, Ashenfelter and Johnson (1969) assume profit maximizing behavior of firms, but exogenous rule-based behavior of workers. They also embrace the three-party nature of collective bargaining by including the coordination problem between union members and union leaders. The idea is that members may have higher wage expectations than leaders are able to achieve given the firm's willingness to pay. Members demand a strike if these wage expectations are not met. Leaders try to lower these expectations prior to the end of their contract, but if unsuccessful, may allow the strike since signing an agreement which is less than the rank and file expects could result in union dissension and a decline in the power of the leadership. A strike, although contrary to the membership's best interests, is preferred by the leadership since they

at least appear as adversaries against management. Ashenfelter and Johnson explain that the strike is a costly equilibrating mechanism: "The outbreak of a strike, however, has the effect of lowering the rank and file's expectations due to the shock effect of the firm's resistance and the resultant loss of normal income. After some passage of time the leadership feels that the minimum acceptable wage increase has fallen to a level at which it can safely sign with management, and the strike ends" (37).

Strikes, then, according to this paper, are a result of rigidity in union behavior—that is assumed rather than endogenously determined—manifested in a type of principal agent problem. Strictly speaking, however, the model dodges Hicks' paradox by strapping the union to a concession function and only allowing the firm to behave optimally. Prevailing conditions such as unemployment and profits are what determine the rank and file members' expectations (and concession function) to which the firm best responds.

Despite the theoretical sidestepping, Ashenfelter and Johnson's model creates some useful and testable predictions. In particular, that unemployment and real wage growth decrease the expectations/demands of union members and decrease the strike rate. Their empirical analysis confirms these predictions.

Another popular approach from Reder and Neumann (1980) and Kennan (1980) is the joint-cost theory. The principle here is that mistakes are less common if they are more costly. Unions and firms avoid conflict by writing protocols to handle situations that might come up over the life of their bargaining relationship. Contracting these protocols, however, is time consuming and expensive, so not all contingencies get negotiated, only the most costly ones. By this reasoning, strikes are still mistakes, but they are less likely to occur when there is a protocol covering the contested issue, and this agreement is more likely to exist when the joint-cost is higher.

Finally, strikes may occur because of optimism. This might be due to an over-estimate on the part of the union, the union leaders, or the firm of their respective probabilities of prevailing in a strike. However, an over-estimate of probabilities is not necessary to induce a strike. First, there can be genuine disagreement about the estimated probabilities as these are often *subjective* and there are many conditions that need to be satisfied for different individuals to arrive at the same estimated probabilities, especially when communication of each others' knowledge and information can be limited. Second, even if there is agreement on probabilities, there are rational departures from the expected utility framework that could lead to well-defined optimism. Thus, using Quiggin's (1982) "anticipated utility" approach—that later prevailed with the name of rank-dependent utility—it can be shown that a risk-seeking attitude towards probabilities implies optimism. Using such an approach, Yang (2020) shows that risk-seeking attitudes within the rank-dependent utility framework in contests can lead to a preference for a probabilistic outcome such as a strike over a bargained, deterministic outcome under the threat of a strike. Thus, there are many ways in which justifiable probabilistic estimates of the outcome can lead to strikes.

3 Strikes Driven by Private Information

Among attempts to explain strikes as rational behavior, the dominant approach has been to attribute their cause to some form of private information. Strikes then essentially become a costly means of revealing information.[3]

One class of such models, following Kennan and Wilson (1993)'s classification, may be termed screening models (developed by, among others, Sobel and Takahashi, 1983; Hayes, 1984; Fudenberg et al, 1985; Gul et al, 1986; Tracy, 1987). These models feature unions that are uncertain about the profitability (or willingness to pay) of the firms with which they bargain. The firms, of course, have reason to downplay their true profitability in order to deter high wage demands. So to combat the pooling problem, unions use the credible threat of strikes to screen firms with low valuations from those with high valuations. That is, they make high initial offers to separate out the high types who stand to lose more in a work stoppage. This strategy can induce a separating equilibrium because a labor dispute is more costly for high types than for low types, making it prohibitively expensive for highs to mimic.

One problem with screening models is that they assume offers are made between fixed intervals of time (either with alternating offers between the union and firm or with only the union making offers), for no apparent reason. This assumption lends these models an unappealing feature called the Coase Property (first conjectured by Coase, 1972 and elaborated upon by Stokey, 1981 and Gul et al, 1986), which states that as the length of the interval between offers shrinks, wage offers as well as the duration of strike in equilibrium get arbitrarily small. In other words, unless the union can commit to delays between offers, the firm ends up capturing all of the gains of trade, and there are essentially no strikes (see Gul et al, 1986, for an intuitive explanation of this result). The challenge, then, becomes one of explaining how the union can commit to delaying offers, or alternatively, why offers cannot be made continuously in practice (e.g. Hart (1989) who rationalizes delays in terms of transaction costs).

A closely related class of models overcomes this problem by allowing agents to choose the length of time between offers as a way of signaling their valuations. In these signaling models (Admati and Perry, 1987; Cho, 1990; Cramton, 1992), a firm (union) can credibly signal its valuation (reservation wage) only by undertaking a costly delay until making its (first and final) offer. Once all private information is truthfully revealed through each party's timing of offers, the parties agree on the wage predicted by the Rubinstein (1982) model of bargaining with complete information. Signaling models of this form suffer, however, from an apparent lack of empirical plausibility. Kennan and Wilson (1993) demonstrate that the union interest rate parameter would have to be implausibly large for the model to generate strike durations that resemble actual data.

Nevertheless, a refinement of the signaling approach, due to Cramton and

[3]There has been a dearth of empirical tests of bargaining models under private information, including in the union literature. Recently there have been some empirical investigations of bilateral bargaining that is over prices in consumer and business-to-business settings that finds substantial costs from private information (see Backus et. al., 2020, and Larsen, 2020).

Tracy (1992), potentially goes a long way toward explaining observed patterns. Their key contribution is to include the option of a holdout for unions as an alternative way to delay agreement. The authors observe that most countries allow workers to keep working under their expired contract while negotiations are under way. This gives unions the option to hold out and work to rule (at some cost to the firm) if they don't want to strike and give up their ability to work under the old contract. Between these two options, the union will be inclined to choose the strike weapon when either the real value of the status quo wage declines (through uncompensated inflation), or workers' outside income opportunities during a strike improve (e.g. through increased local labor demand). The mechanism by which the composition of labor disputes shifts toward strikes offers an intuitive explanation for the widely noted pro-cyclicality of strike incidence (to be discussed in Section 8), which is challenging for traditional models to explain since private information drives these models but does not have any obvious relationship to the business cycle.

The crucial assumption underlying both the screening and signaling models, i.e. that unions are uncertain about the profitability of the firm, may be questioned on the grounds that a less profitable firm could simply open up its books to convince the union of their inability to pay, thereby averting a costly strike. Once firms with the lowest valuations opt for this strategy, then incentives to keep valuations private can rapidly unravel for firms with successively higher valuations, leaving no screening or signaling role for strikes. Even so, it may be argued that even after information about accounting profits have been revealed, uncertainty about economic profits may remain. For this and other reasons, it is reasonable to expect the union to be somewhat more uncertain about the firm's profits than management. The real issue, however, is whether such uncertainty would in practice be large enough to generate strikes motivated by screening. It may be that although workers individually have little knowledge of the firm's financial standing, the union as a collective has a fairly good idea by virtue of its ability to aggregate information from the field on the day-to-day operations of the firm.

Whereas both the screening and signaling models identify the firm's unobserved profitability as the source of uncertainty generating conflict, "war of attrition" models locate the source of uncertainty in the parties' mutually unobserved linear additive costs of delaying agreement. Originally proposed by Maynard Smith (1974) to explore evolutionarily stable equilibria in animal behavior and later adapted to economic settings by Fudenberg and Tirole (1986) and Nalebuff and Riley (1985), these models assume a winner-take-all setting in which the first party to back out of a contest loses all claim to the contested prize. Each contestant's optimal timing of capitulation depends on the probability distribution of both parties' cost per unit time of remaining in the contest (which is assumed to be common knowledge) and the privately known realizations of those costs. Intuitively, a low-cost party stays in the contest longer in the hope that she would be able to outlast her adversary, who likely has a higher cost.

A great advantage of war of attrition models is that at a descriptive level,

they capture the essential character of strikes as contests of endurance. They are also natural candidates for explaining the declining rate of settlement in strike duration that is often observed in the data (e.g. Kennan, 1980), owing to the feature that optimal stopping times tend to increase exponentially as realized costs decrease.

One difficulty with war of attrition models, however, is that they generally feature an infinite number of equilibria, with no obvious equilibrium selection criterion: even in a perfectly symmetric case of two players having the same valuations and the same distribution of costs, it is not obvious that they should also follow symmetric strategies. This raises the question of how coordination between the union and firm on a particular pair of equilibrium strategies might arise in the first place.

Some scholars have critiqued these models on grounds that the winner-takes-all (or indivisible prize) assumption does not allow for compromises. But this does not in and of itself make war of attrition models irrelevant to strikes: while wages and benefits may be inherently divisible, certain objects of contest such as union recognition or job security may confer discrete benefits to the union. Card and Olson (1995) suggest that strikes in the late nineteenth century U.S. had a binary win-or-lose character in terms of wage outcomes because they were primarily recognition strikes (see also Geraghty and Wiseman, 2008).

Finally, for an intermediate between signaling models and war of attrition models, one might consider the approach of Sanchez-Pages (2009), whereby the two parties can "dip their toe" in a trial strike to gauge each others' strength. Such strength might include the extent of union members' own support, the attitudes of their community and of government institutions, and the resolve of the firm's management to see a strike through. Allowing for intermediate cases of trial strikes allows for the revelation of information that could lead to a negotiated settlement or to a bigger strike.

4 The Relevance of Future Interactions and the Shadow of the Future

A surprising aspect of most extant strike models is that union-firm bargaining is almost always treated as a one-time interaction: the union and the firm's problem is to settle on the terms of a single upcoming contract (either peacefully or by striking) without regard to how the outcome of the current dispute will affect future disputes over future contracts. This omission lends the standard models a static flavor even when they are formally dynamic. In this section we examine two models that are more dynamic in the sense that they consider the effects of strikes on future bargaining outcomes. We first review models that allow strikes to enhance one side's reputation. We then construct a model under an indefinite horizon with the possibility of the union dissolving if they lose a strike. A higher discount factor (a longer shadow of the future) increases the likelihood of a strike in that model.

4.1 Reputation-building

An intuitive reason that unions may go on strike despite the short-term cost involved is to build or preserve a reputation for resisting offers that the union considers unfair, so as to deter the employer from driving too hard a bargain in future negotiations. Despite this intuitive appeal, reputation-building has seen surprisingly little attention as a candidate explanation for strikes. Below we summarize the few papers that exist on the topic, and discuss where there is room for further research.

A good place to start is the straightforward approach of Kreps and Wilson (1982). They show that introducing a small amount of private information about a player's payoffs can induce a monopoly firm to predate on market entrants. By establishing a reputation of aggression against entrants, a monopolist can overcome the full-accommodation prediction of Selten's (1978) chain-store model. Similarly, Milgrom and Roberts (1982) predict reputation building behavior when potential entrants are uncertain about the type, 'predatory' or 'accommodating', of the monopolist. While these papers are not directly aimed at explaining reputation strikes, they apply naturally and show how one side may incur costs early to create a tough reputation for future interactions.

The only paper we know of that explicitly models reputation strikes is Calabuig and Olcina (2000). Similar to Milgrom and Roberts, they assume there are "types" of players that behave rigidly and dogmatically. What drives strikes is a firm's (union's) uncertainty about which type of opponent they are facing. 'Normal' types accept any settlement each period that is above their reservation wage/profit, while 'tough' types strike/lockout unless they can extract everything but their opponent's reservation wage/profit. If the firm (union) knows for certain that it is facing a tough type, its optimal strategy is to offer the full share every time; absent such knowledge, however, the firm (union) would want to test the other's type by making a low offer meant to screen the normal types. If the union (firm) rejects such an offer and a strike ensues, the firm (union) may infer the other player to be a tough type, and concede the whole prize thereafter.

But this environment creates incentives for normal types to mimic the toughs in the hope of securing better offers in the long run. The result is that even if the actual percentage of tough types in the population is very small, mimicry by normal types can generate strikes for multiple periods at the outset of a bargaining relationship between any union-firm pair. After some time, normal types who have resisted screening offers enough times will have successfully established a reputation for toughness, while those who caved in too soon will be exposed. The expected number of consecutive strikes in such formative periods is increasing in the degree of patience of the players, i.e. the more the future matters, the greater the value of reputation in the long run, and the more likely it is that players fight to establish it.

Calabuig and Olcina's model (and models of reputation-building more generally) suggest that strikes for reputation purposes happen early in a union's history. If a union or firm manage to earn a reputation for toughness, it is

because they convinced their opponent early on that they were of a certain type. This reputation will last forever since their type does not change, absent perhaps a change in union leadership or management.

We find this permanence a bit unsatiating. Strikes tend to be more periodic than front-loaded (e.g. France). And while one can certainly find examples of unions born into conflict, a typical union will not see all its action right away. We think more attention should be given to modeling Hicks' perception of reputation strikes: "Weapons grow rusty if unused, and a Union which never strikes may lose the ability to organise a formidable strike, so that its threats become less effective. The most able Trade Union leadership will embark on strikes occasionally, not so much to secure greater gains upon that occasion (which are not very likely to result) but in order to keep their weapon burnished for future use, and to keep employers thoroughly conscious of the Union's power" (146).

Reputations in a long-lasting relationship can erode and become exposed to questioning. Fights are one way to maintain credibility and silence any doubts. Even the toughest old bull has to fight every so often to maintain his reputation in the herd. Future research along this vein could prove very fruitful.

4.2 Compounding rewards to the winner of a strike

As we just saw, a strike need not be just about the immediate division of rents between a union and firm. Beyond the issue of reputation-building, however, either a successful or an unsuccessful strike for the workers could well have long-term strategic consequences in terms of the distribution of power between a union and a firm. A successful strike could induce future recruitment, galvanize the union's members, and reduce the firm's resistance to the union's demands well into the future. An unsuccessful strike from the workers' perspective could reduce and demoralize the union's membership and increase the firm's bargaining power in future negotiations; it could even lead to the dissolution of the union. Moreover, the effects of a landmark strike could even spill over to the interaction of all unions and firms in the economy; the PATCO strike was arguably one such strike.[4]

To illustrate how such long-term strategic considerations can lead to a strike even under compete information, we examine a simplified version of the model in Chun (2020a) (and those of the case of conflict in Garfinkel and Skaperdas (2000) and McBride and Skaperdas (2014)).

Consider a Union U and a Firm F that may interact over an indefinite horizon. In each period they compete over a rent of value R. This rent can be

[4]In 1981 the Professional Air Traffic Controllers Organization (PATCO) began a strike for better pay and working conditions. Since the strategy violated US law pertaining to strikes by federal employees, President Reagan intervened and publicly fired workers who refused to return to their posts, hiring replacement workers wherever he could find them. The very public nature of the ordeal made it a landmark event in labor history, signaling the end of the capital-labor accord and validating anti-union tactics. A slew of union busting efforts soon followed by employers across the US (McCartin, 2011).

viewed as the difference between the workers' reservation wage and the maximum wage the firm is able to pay without making losses (as in models of strongly efficient labor contracts, it is assumed that the negotiated wage level does not affect employment). In each period that they have to negotiate a contract they expend fixed resources e_u and e_f in anticipation of a possible strike. e_u may take the form of contract campaigns to educate and galvanize workers, PR and community outreach efforts to generate public sympathy, and legal counsel as well as logistical preparations for a strike. On the employer's side, e_f could involve costly frontloading of production schedules to build up inventories, time and attention devoted to negotiations, and efforts to dissuade employees from joining a strike. Such efforts need not be restricted to preparations for bargaining or a strike during contract season: as long as a labor contract ensuing from such barganing or strike is incomplete, there will likely be continuous haggling over the concrete meaning of its provisions throughout the life of the contract, which may involve costly arbitration battles or even a mid-contract strike. An important feature of these efforts is that they are by nature difficult to monitor and therefore hard to contract in advance. No party can credibly commit not to exert effort to strengthen its position in future disputes, and we shall see that this commitment problem is a key generator of strikes in the model developed below.

At the beginning, the union's winning probability in the event of a strike is $\lambda \in (0,1)$ and the firm's winning probability is $1-\lambda$. The parameter λ encapsulates the relative strength of the two sides that can have many different sources in addition to the capabilities of the union and the firm: The legal, institutional, or public support that the two sides can command. In case of a strike that is won by the union, the union receives the available rent R and the probabilities in the next period remain the same. In the case of a loss by the union, however, the union dissolves and the firm keeps the whole R thereafter.[5] This is an assumption that only simplifies notation and does not change the essence of the results—instead a host of other modifications such as having different (and endogenous to efforts) probabilities of winning for the two sides in the future after a strike or one side receiving the rent exclusively for a fixed number of periods would provide similar results (see Chun, 2020a).

A strike is also costly (in terms of disruption and forgone production and earnings). Let the union and the firm each incur cost $C > 0$ in the event of a strike. (Allowing for different costs does not change the nature of the results.) Then, the one-period expected payoffs in the event of a strike are:

$$\begin{aligned} U_u^c &= \lambda R - e_u - C \\ U_f^c &= (1-\lambda)R - e_f - C \end{aligned}$$

Given the extra costs of a strike, from a short-run perspective the two sides could improve their payoffs by negotiating a division of the rent. For example,

[5]This assumption does not apply directly to settings where multiple unions exist in the same workplace. In practice, however, workers in individual firms are able to support no more than a single viable union, especially in countries such as the US where exclusive representation is the norm

within a period it is readily apparent that dividing the rent according to the winning probabilities would make both better off compared to the expected payoffs under a strike since each side would not incur the cost C.

Since both sides are considered to be forward-looking by maximizing their discounted infinite-horizon expected payoffs, any negotiated outcome should be taking into account this long-term horizon. We suppose that in each period that has not led to the dissolution of the union in the previous period, first each side expends its enforcement costs e_u and e_f and then there is bargaining. Suppose that the union has all the bargaining power and makes an offer to the firm, which the firm can either accept or reject (that is, they engage in ultimatum bargaining with the union as the proposer, a protocol that does not affect the nature of our results).

We seek to derive Markov Perfect Equilibria (MPE) with or without a strike. We compare two Markov Perfect Equilibria, one in which there is never a strike, and one in which there is a strike in every period. If parameters are such that payoffs are higher in the latter, then a bargain fails to hold as an equilibrium and strikes will occur. Recall that a strike would lead to the absorbing state of the dissolution of the union with probability $1-\lambda$ whereas with probability λ the union wins. Then, conditional on e_u and e_f that have already been expended, in an MPE that were to involve a strike in every period would yield the following expected payoffs for the union

$$\begin{aligned} V_u^c &= \lambda(R+\delta(V_u^c-e_u))+(1-\lambda)0-C \Rightarrow \\ V_u^c &= \frac{\lambda}{1-\lambda\delta}R-\frac{\lambda\delta}{1-\lambda\delta}e_u-\frac{1}{1-\lambda\delta}C \end{aligned} \tag{1}$$

The firm's expected payoff under such an MPE would be

$$\begin{aligned} V_f^c &= (1-\lambda)\sum_{t=0}^{\infty}\delta^t R+\lambda\delta(V_f^c-e_f))-C \Rightarrow \\ V_f^c &= \frac{1-\lambda}{(1-\delta)(1-\lambda\delta)}R-\frac{\lambda\delta}{1-\lambda\delta}e_f-\frac{1}{1-\lambda\delta}C \end{aligned} \tag{2}$$

In an MPE without a strike the firm would accept any division of R in every period that would yield at least as high an infinite-horizon payoff for itself as V_f^c in (2). Letting $1-\beta^*$ denote that minimum share of R that the firm would accept given (2), we would need to have

$$\begin{aligned} V_f^b(\beta^*) &\equiv (1-\beta^*)\sum_{t=0}^{\infty}\delta^t R-\sum_{t=1}^{\infty}\delta^t e_f \\ &= \frac{1-\beta^*}{1-\delta}R-\frac{\delta}{1-\delta}e_f=V_f^c \end{aligned} \tag{3}$$

For such a division of the rent to be viable as an MPE, the payoff of the union must be as high as that under a strike in (1) or

$$V_u^b(\beta^*)\equiv\frac{\beta^*}{1-\delta}R-\frac{\delta}{1-\delta}e_u\geq V_u^c \tag{4}$$

For such a viable β^* to exist and since we have transferable utility, the sum $V_f^b(\beta^*) + V_u^b(\beta^*)$ in (3) and (4) should be at least as great as the sum $V_u^c + V_f^c$ in (1) and (2). Using (1)-(4), we eventually obtain:

$$2C \geq \frac{\delta(1-\lambda)}{1-\delta}(e_u + e_f) \tag{5}$$

If (5) is not satisfied, a strike in every period that is not an absorbing state is better for both sides than a bargained outcome forever (as an MPE under bargaining would be), and therefore only an MPE that involves a strike exists in such a case.

To explore the intuition for the conditions that induce a strike in our setting, consider the share of the rent that the firm would minimally accept that can be derived from (3) and (2):

$$1 - \beta^* = \frac{1-\lambda}{1-\lambda\delta} + \frac{\delta(1-\lambda)}{1-\lambda\delta}\frac{e_f}{R} - \frac{1-\delta}{1-\lambda\delta}\frac{C}{R} \tag{6}$$

The share that the firm would receive in case of a successful bargain is increasing in the firm's own enforcement cost e_f that would be paid in future periods that would not involve a final win by the firm. This is because the firm would continue to have to pay that cost if they were to continue to bargain (as can be seen from (3)); that cost would have to be paid in the case of future strikes as well, but in discounted terms it would be lower than under continuous bargaining because it would not be paid if the firm were to win and the union would dissolve. That's a key saving to the firm that comes about from the possibility of the union dissolving. The cost to the firm in the event of a strike (C) also, predictably, reduces the minimum share of the rent that the firm can claim in the event of a bargain. Finally, the firm's share is decreasing in the union's win probability in the event of a strike (λ).[6]

For a bargaining outcome to be supported as an MPE, the implied share of the union (β^*) has to satisfy (4) yielding similar effects as (6) for the union.

Overall, (5) shows that a strike is more likely under the following conditions:

- When the regular costs of enforcing a bargain ($e_u + e_f$) are high enough. These are essentially the costs of bargaining and they are avoided from the point that the union loses a strike and dissolves and the firm remains unbothered by the union. Similar effects would exist if a win by one side were to bring in strategic benefits that extend into the future. These strategic effects, such as the seeming effect of the failure of the PATCO strike, might go beyond the particular event especially if at least one decision maker (as the Reagan administration had in that strike) has an interest in extending the implication of a particular event to other strategic arenas

[6] It can be shown that $\frac{\partial(1-\beta^*)}{\partial\lambda} = -\frac{1-\delta+\delta\frac{e_f}{R}(1-\delta)(1+\lambda)+(1-\delta)\frac{C}{R}}{(1-\lambda\delta)^2} < 0$

- The lower are the immediate costs of a strike ($2C$).
- The lower is the union's probability of winning a strike (λ). With a lower λ, the easier it is to end in the absorbing state of an all-victorious firm and the absence of any bargaining costs in the future. Firms become more aggressive in seeking out this state. Again, the assumption of an absorbing state is unnecessary for the qualitative effect. As Chun (2020a) shows what is needed is that a loss for one party today leads to a worse chance of winning in the future. The union's probability of winning a strike includes many institutional factors, including the legal framework concerning labor and its enforcement, press and public support for unions versus firms, and unemployment and the stage of the business cycle.
- The higher is the discount factor δ. The higher the discount factor is, the greater is the "shadow of the future" and the greater is the importance of a strike's long-term strategic effect. That is, the discount factor is an important determinant of the strategic effect's size that brings about a strike. Note that this is the opposite effect than what is advanced through folk-theorem arguments in repeated games. In indefinitely repeated games, cooperation can emerge through history-dependent strategies that punish conflictual deviations. However, in repeated games the same exact game is repeated period after period and there are no strategic effects that would change the game in the future of the type we examine. "Grim-trigger" strategies might be possible in offshoots of our game (that do not have absorbing states), but the conditioning in history would be difficult to justify. Moreover, such strategies would not be as robust as the MPE ones that we have in our game. Therefore, the effect of the "shadow of the future" that we identify is more plausible than the intuition that emanates from the folk-theorem argument.

5 Strikes Under Complete Information

While most strike theory features the role of asymmetric information in some form or another, there are a few papers that show how conflict may occur from sequential bargaining with complete information. The first paper to do so is Fernandez and Glazer (1991). They analyze an alternating offers game where a union and a firm take turns making a wage offer in discrete time. If an offer is rejected, the union may decide to strike, and induce zero payoffs for both players, or holdout and split profits according to the status quo wage. Each side has their own discount rate over an infinite horizon, and the game continues until they reach agreement.

Their breakthrough contribution shows that there are many equilibria that can be sustained if players commit to the right pattern of strikes, holdouts, or lockouts. In particular, a union can achieve a maximal wage equilibrium with an alternating-strike strategy in which they strike whenever the firm rejects their

offer. This outcome is not meant to be a prediction, however, since there are many other patterns that are also sustainable under certain conditions.[7]

Fernandez and Glazer's contribution was important to the research frontier, but it is a hard paper from which to glean lessons regarding why strikes happen. The complicated off-path strategies are hard to justify in the real world, and the multiplicity of equilibria make predictions nearly impossible. The cleanest lesson apparent in the conclusion is that "the lower the status quo wage and the more profitable the firm, the greater the maximum length of time for which the union may strike in equilibrium" (249).

Strikes under complete information can also be stimulated by power asymmetries and cost asymmetries. A feature of collective bargaining is that unions and firms prepare in advance for the possibility of a work stoppage. If one side enjoys cost advantages, or institutional favor (through the courts or labor law, for example), they may be able to use this investment stage to dominate their opponent in a strike. Schaller and Skaperdas (2020) show that one side may prefer work stoppage ex ante if there are sufficient asymmetries in strength. An implication is that greater balance in institutional support for different sides is more likely to maintain industrial peace.

Similarly, imbalanced destruction costs can result in conflict. If one party bears more of the losses from a work stoppage, their opponent may desire to pick a fight. Garfinkel and Syropoulos (2018) use a guns-versus-butter approach to show that "one of the contending parties in a dispute could have a short-run incentive to commit to war if its effect on the contested output of the defeated side is greater." In practice, it's hard to make a general statement about who incurs the heaviest costs in a strike. Sometimes it's labor, since firms can "eat their capital stock," but sometimes firms cannot afford to lose market share in a competitive industry. It would be an interesting empirical exercise to see whether unions strike more often when firms are likely to bear a disproportionate share of the losses.

Note that this prediction stands in contrast to previous thought. Most studies about costs have only been concerned with the joint costs of a strike since "costs which are incurred by one side can be shifted to the other side by making a more generous bargaining proposal" (Kennan, 1986). This joint-cost theory predicts that higher costs, no matter who bears them will result in fewer strikes. Short term commitment problems can prevent this shifting, however, and result in more strikes.

6 Solidarity and Union Identity

Solidarity is not a topic that economists typically examine when it comes to unions or, even, know what to make of the concept. Yet, anecdotally it is an important component in the success of unions and union movements (Mont-

[7]Relative discount rates matter for some equilibria's existence. See Bolt (1995), Haller (1991), Haller and Holden (1990), and Houba and Wen (2008) for more discussion of Fernandez and Glazer's model.

gomery, 1989; Varoufakis, 1989). Further, solidarity would appear to be even more relevant for the success of a strike in at least two senses. First, the material support that strikers receive due to the mutual aid that comes from solidarity helps increase the likelihood of a strike's success. Second, the strike itself can increase the psychological identification of workers with one another and with the union.

Could both effects, then, induce a strike? We present a preliminary "toy" model in which a strike is possible when solidarity induces a psychological payoff in addition to the material payoff that comes from wages. We follow the approach of Akerlof and Kranton (2000) who introduced the modeling of identity to economics. We also draw on previous decades of experimental and psychological research showing that individuals typically care beyond their own material interests to include social groups with which they identify (e.g., Taijfel and Turner 1986). Here we follow the general modeling approach of Sambanis et. al. (2015) who studied nation-building through war.

A worker can be thought of as adopting one of two potential identities, that of a "union loyalist" or that of an "individualist." An individualist derives material utility from the prevailing wage, w, and a psychological payoff from the feeling of not having connections to others, μ, (from being a "monad") so that

$$U_m(\mu) = w + \mu \tag{7}$$

where μ is distributed across the population of workers (μ can be negative for those who may be more social and dislike being monads).

Identifying with the union also has a material and a psychological component. In the absence of a strike, the payoff a union identifier is

$$U_u = w + s' \tag{8}$$

where $s' > 0$ is the psychological payoff of identifying with the union. (As we will discuss later, the psychological payoff can take different values when there is a strike.) Both the individualistic and the union psychological payoffs can vary as a result of conditions in the economy, society, and the experience of the union itself. (However, to keep complications to a minimum we don't allow variation across the population in how solidarity is valued by different workers.)

If each worker were to choose between the two identities when everybody receives the same wage and in the absence of a strike (that is, comparing (7) to (8)), then there would be a μ' such that all those with $\mu > \mu'$ would identity as individualists, whereas those with $\mu \leq \mu'$ would identify with the union. (Note how more individualistic societies—because of a distribution of the population more to the right for μ—would have fewer workers identifying with the union.)

To consider the possibility of a strike, we suppose there are two stages (with further details following):

1. Each worker chooses whether to identify as an individualist or with the union.

2. Those who identify with the union choose whether to strike or not.

For ease of exposition continue to denote the union payoff in (8) as the payoff in the absence of a strike. As we outlined above, solidarity can have two effects on a strike.

First, it increases the likelihood of a strike's success. Moreover, the greater the number of workers who identify with the union, the more we can expect that likelihood to be as well. Therefore, we assume that the probability that the union wins in a strike is $\lambda(\mu^s, s')$ which is increasing in both arguments (μ^s is the cutoff parameter for those who identify with the union when, comparing the strike payoff of a union loyalist such as the one below in (9) to the individualist payoff in (7)).

Second, the strike itself could well increase the psychological payoffs in identifying with the union, certainly in the case of a win but even in the case of a loss.

Consider, then, the following expected payoff function of a union-identifier who strikes:

$$U_u^s(\mu^s) = \lambda(\mu^s, s')(w_h + s_h) + (1 - \lambda(\mu^s, s'))(w_l + s_l) \tag{9}$$

where w_h is the wage and s_h the solidarity payoff in case the union wins the strike, and similarly the w_l and s_l are the two types of payoff in the event of a loss by the union.

Union identifiers will choose to strike if the payoffs under (9) were to be higher than those under (8). That would be the case if s_h and s_l were higher than s', and w were not too high relative to w_h and w_l. To fix ideas, however, suppose for the moment that

$$w = \lambda(\mu', s')w_h + (1 - \lambda(\mu', s'))w_l \tag{10}$$

That is, suppose that the wage in the absence of a strike were to be exactly equal to the expected wage under a strike with the probabilities determined under the assumption that union identifiers are the same as those who would prevail as if there were no strike. Normally, of course, we would expect the expected wage under a strike to be higher than that in the absence of a strike; therefore, this is a weak condition. Moreover, if a strike were to indeed occur and the payoff under (9) were to be higher than that under (8), then some individualists who would be previously sitting on the fence would jump in and identify with the union, something that would increase the chances of the union winning the strike, thus making the expected payoff of a strike even higher.

Under (10), and given (8) and (9), there would be a strike if

$$s' < \lambda(\mu', s')s_h + (1 - \lambda(\mu', s'))s_l \tag{11}$$

which can hold even if the solidarity payoff under a loss (s_l) were to be lower than the solidarity payoff in the absence of a strike (s').

If that condition were to be satisfied, all workers with $\mu \leq \mu'$ who would identify with the union in the absence of a strike would also identify with the

union under the strike and would have higher payoff under the strike. It follows, then, that there would be some workers with $\mu > \mu'$ who would now have a higher payoff by identifying with the union that goes on strike. Since that would increase the cut-off μ^s, the union's probability of winning $((\lambda(\mu^s, s'))$ would increase, further increasing the union-identifiers' payoff. That process would end when enough individualist fence-sitters identify with the union with a new cutoff μ^* so that $U_u^s(\mu^*) = U_m(\mu^*)$.[8]

Thus, to the extent that the expected psychological payoff of those who identify with the union is higher than that in the absence of a strike and (11) is satisfied, a strike would not only be preferable but the probability of winning would increase as this would create a "bandwagon" effect of more workers identifying with the union.

Over a number of decades we have seen reductions in the number of union members in the US and other Western countries, reductions in strike incidence, and perhaps a reduction in the reputation of, and solidarity with, unions. All of the above trends would also correlate with lower identification of workers with unions and the union movement. We have shown how such correlations make sense in a rather simple model that can be considered just the beginning of further inquiry into the relationship between union solidarity, union identification, strikes, and the strength of unions.

7 Internal Union Politics and Fragmented vs Centralized Bargaining

Theories of strikes examined thus far all assume a binary bargaining pair, a firm and a union, treating both as internally cohesive decision-making units. In reality the bargaining problem may involve more than two agents: a union may be divided between its leadership and rank-and-file; multiple unions may represent workers in the same firm (multi-unionism); or a union may bargain with many employers in the same sector (sectoral bargaining). The multiplicity of competing interests adds an extra layer of complexity, which may explain the paucity of attempts to capture the effects of bargaining institutions more complicated than the firm-level exclusive structure that prevails in the U.S. But a comprehensive theory of strikes must not neglect this institutional dimension if it is to have broad applicability outside the U.S., and yield insights into why strikes are persistently more frequent in certain countries than in others. In this section we review some attempts to understand how strikes might arise from internal union dynamics and the effects of multi-union and multi-firm bargaining.

[8] Assuming that the distributiion of μ is continuous.

7.1 Internal Union Politics

First we discuss the possibility of union leaders having a separate agenda from the workers they represent. This topic has been recognized by labor movement theorists at least since Michels (1911), and is also implicit in Ashenfelter and Johnson (1969).[9] The more recent work we highlight comes from Ahlquist and Levi (2013). They create a moral-hazard-in-teams model building off Hermalin (1998, 2007) that explains how union leaders can inspire collective action from rank and file members for activities outside the core purpose of the union. Examples include sympathy strikes and boycotts for political or social ends. These actions don't benefit the union directly, but are examples of rent that leaders may extract if they are successful at providing their essential service to the union.

The model assumes that leaders obtain private information about the potential effectiveness of group effort, either high or low. They communicate this state of the world to members who each decide how much effort to contribute. If the membership can trust the leader, they will contribute optimally for the communicated state of the world. However, the leader always has an incentive to lie when effectiveness is low so that efforts (except for hers) are high. In a one-shot game, everyone recognizes that the communication is cheap talk and ignores the leader. In the repeated game, truth telling can be an equilibrium if the members employ a grim-trigger strategy where they forever ignore the leader if she ever lies. Thus, if a leader is sufficiently patient, she can maintain an equilibrium in which she always tells the truth and extracts rents for sharing valuable information. These rents could be pecuniary, but they could also take the form of support for peculiar activities the leader fancies, including a radical strike not strictly in the union's interests.

The model is simple, but it is well supported by four interesting case studies. Together they show how some unions willingly, and even enthusiastically, strike to support pet positions of effective leaders.

A critique of the model is that it largely treats the leaders' penchant for radical political activities as divorced from their union's best interests. One possibility is that unions can promote members' interests more effectively if they come to each others' defense when attacked (as in sympathy strikes), or fight in concert for political ends (e.g., for a shorter working day) rather than fight individually for purely economic gains within their workplaces (what the authors view as the 'core purpose' of unions). The leaders may recognize this while lay members may not. There is no strict reason, however, that only the leaders should adopt this broader perspective: rank-and-file members could also recognize the need for broader solidarity in a shared community of fate.

The second paper we discuss focuses less on leadership rents, and more on

[9] Jackson and Morelli (2007) provide an analogous model in the case of war. They show how war can occur when the leadership's objectives are misaligned with those of a country's population, without delving into the mechanisms of such a misalignment. Largely because of the absence of a mechanism about how union leaders might prefer a strike to a settleed outcome, there is no clear analogy with our case. However, the papers that we mention next provide for such mechanisms.

union survival. Chun (2020b) takes up an old idea that union leaders may seek to maximize the size of their organization rather than the wage bill or welfare of a representative union member (Ross, 1948; Lewis, 1963; Atherton, 1973; Farber, 1986). He explores how this may give rise to both strikes and tensions between union leadership and rank-and-file members. The basic premise is that workers only join a union if the wage concession extracted from the firm justifies the cost of becoming a member (from membership dues and other burdens that come with engagement). This calculus requires the union to win a concession equal to or higher than the cost of membership if it is to sustain itself. The firm, however, may not be willing to concede even this amount if the union's capacity to organize an effective strike is sufficiently weak. In fact, the firm may even prefer a strike if it finds the very existence of a union distasteful and a strike might uproot the union. Hence, leaders of weaker unions will be compelled to strike (if they can) to assert their right to exist, even if this isn't necessarily in the interests of workers when the costs of striking are weighed against the expected wage gain.

The other side of this story is that unions of sufficient strength may settle for a concession that is lower than workers' threat payoff (expected wage gain from a strike minus strike costs) to compensate the firm for its aversion to the union and thereby avoid a strike. This is because at this range of union strength, union leaders can accept a modest concession and still secure a membership base that is higher than the expected membership under a strike. Union leaders in this scenario care more about the number of workers signing up than about the intensity of members' loyalty to the union, and so can favor a disappointing compromise over a fight that can jeopardize the survival of the union—as long as they can deliver just enough for members to hold on to their membership cards.

Although not explicitly addressed in Chun (2020b), the possibility that leaders of powerful unions can systematically underserve the interests of workers may explain various unsanctioned strikes staged by disgruntled rank-and-file workers. The 'wildcat' (or mid-contract) strike waves of the 1940s and 1960s U.S. had this character (Davis, 1999).

7.2 Fragmented vs Centralized Bargaining

A long line of empirical work starting with Ross and Irwin (1951) have found that countries with more numerous trade union federations tend to have more strikes. But the reasons behind this pattern remains under-explored. Researchers have speculated, but not formally shown, that multi-unionism has the effect of forcing unions to compete for members either by using strikes as a platform of publicity (the 'propaganda' effect) or by pushing more aggressive demands that likely result in strikes (the 'jealousy' effect; see Akkerman, 2008 for a summary and empirical test of these two hypotheses). In a way, the effect of competition for membership is implicit in Chun (2020b)'s model sketched above: in the presence of competition from other unions, membership-maximizing union leaders will be constrained to behave more in accordance with

workers' preferences. For the stronger unions this entails putting up a fight when the firm's offer is below workers' threat payoff.

From a different angle, Cheung and Davidson (1991), Kuhn and Gu (1998, 1999), and Calabuig and Olcina (2000) developed models of sequential bargaining either between multiple unions and a single firm or between multiple firms and a single union. Their general conclusion is that compared to the benchmark of individual union-firm pairs bargaining independently, centralization either on the side of unions (e.g. under a national union confederation) or on the side of firms (either as a single employer dealing with multiple unions or as an employer association) tend to increase strike incidence. The intuition is that under sequential bargaining, a strike that happens at the initial round reveals information to participants in subsequent rounds regarding the type or reservation wage (profitability) of the centralized party. This gives the centralized union (employer) an incentive to initially drive a harder bargain and risk a strike to signal to the other firms (unions) that it is a tough/low-cost type.

These represent important theoretical first steps toward understanding the effects of institutional structure on collective bargaining outcomes. But these few attempts limit attention to the informational role of strikes under sequential bargaining and leave out other implications of centralization or fragmentation, such as the possible role of inter-union rivalry or of centrifugal forces operating in a coalition of heterogeneous unions or firms. To give an illustration, once we consider the ability of a centralized union to impose a uniform industry wage, the finding of the informational models that strikes increase with centralization can be reversed: it may be that a centralized union is better able to pacify employer resistance by enabling firms to simultaneously pass on some of the increased labor costs to consumers without fear of undercutting by rivals (in the extreme, this can even lead to the emergence of a union-enforced cartel). This view certainly accords with historical evidence of firms in competitive industries being more willing to accommodate sectoral bargaining when a union organizes a large swathe of the industry (see Bernstein, 1969 for examples in the coal and garment industries in the 1930s U.S.). In sum, much work remains to be done in this area.

8 Empirical findings

The above discussion of strike models points to several empirical predictions. This section highlights a few key hypotheses, and discusses the empirical literature on strikes.

A plethora of papers from the 1980s and 1990s focused on the cyclicality of strikes. This response was in part due to procyclicality observed in the data, but also because most bargaining models, in particular the joint cost theory, directly predict procyclicality in strike incidence and duration.

Most studies are in accord that higher unemployment is associated with fewer strikes; however, the literature is more mixed on how firm or industry-specific product demand affects strike incidence. Some studies (Tracy, 1986;

McConnell, 1987) show that higher industry demand—proxied through industry employment or relative output price—lowers the number of strikes, evidence that work stoppage is more costly when there is bullish demand, and the firm and union split these costs. Other studies (Abowd and Tracy, 1989; Card, 1990) show a positive relationship, indicating either that strikes are less costly under high demand, or that a work stoppage is asymmetrically costly for the firm and weakens their bargaining position when there is high demand. Thus, unions seize an opportunity to capture the gains. These mixed results suggest that there is a lot of nuance to how unions and firms respond to product/industry demand.[10] A mistakes theory such as the joint-cost hypothesis may not be equipped to explain these data.[11]

A more consistent finding is that strikes decrease when workers experience real wage increases before their contracts expire (Ashenfelter and Johnson, 1969; Gunderson et al. 1986; Vroman, 1989). This result might help explain the mixed findings on cyclicality, and further points to the value of models like Cramton and Tracy's that account for the history of negotiated outcomes, including conditions under the existing contract.

A weakness of the macro-level approach is that it attempts to test micro-theory with aggregate data like unemployment and relative industry price levels. Some patterns can be gleaned from this strategy, but it becomes very difficult to pin down causal mechanisms. Unemployment, for example, could reduce strike activity because it a) reduces the earnings opportunities of striking workers and thus increases the cost of a strike, or b) undermines a strike's effectiveness with the greater availability of replacement workers. With macro data, it is difficult to distinguish whether labor market conditions are affecting the cost calculus, or the bargaining problem (see Wheeler, 1984 for a more detailed critique). Hence, the mechanisms behind strike cyclicality are still unproven.

The fact that there is little consensus about the effects of these variables, exposes a difficulty with empirical research on unions and work stoppages: there is just not a lot of reliable microdata on unions (Southworth and Stepan-Norris, 2009; Schaller, 2020). Much of the U.S. data is scattered across government agency archives and has proven difficult to link. Researchers have had some success gleaning info from collective bargaining agreements, yet these are rarely representative samples. Data can be less of a constraint outside the U.S. where sector-level bargaining is more common, but such a structure departs from the single-firm/union model that we would like to test.

Furthermore, private information models are difficult to test by their very nature. It is hard to think of variables that are asymmetrically hidden ex ante and then suddenly observable to the researcher ex post. One option comes from Tracy (1986, 1987) and Cramton and Tracy (1994) who use variability in stock returns as a proxy for union and investor uncertainty. They find evidence

[10] For more macro-level strike literature, see Kaufman (1982), Paldam and Pederson (1982), Harrison and Stewart (1989; 1984), Ingram, et al. (1993), and Card (1990) for a summary.

[11] Support is further weakened by the counter cyclicality of strike duration. Cramton and Tracy's (1992) model that includes a holdout threat is stronger since it can reconcile the differing patterns in duration and incidence.

that variability in excess returns (but not market returns, importantly) drives a positive and significant relationship to strikes in the U.S. during the 1970s.[12]

In a separate vein of research, one with more directly observable variables, Gramm (1986) and Gunderson, et al. (1989) estimate the effects of government policies. Using Canadian micro-data, Gunderson, et al. show that compulsory conciliation processes and mandatory strike voting significantly reduce strike incidence, while prohibitions on the hiring of replacement workers significantly increased it. Cooling off periods had no effect. These findings are consistent with theory; however, it is not clear whether conciliation services helped because they reduced mistakes and asymmetric information, or because they created additional delays and costs to striking.

Gramm focuses on U.S. manufacturing instead and estimates the effects of local variables such as regional union density, and important state policies like right to work (RTW) laws.[13] She finds that the percentage of unionized workers who are male, the number of workers in the bargaining unit, and the percentage of the total regional labor force that is unionized all increase the propensity to strike. Surprisingly, she finds that RTW laws are associated with higher strike incidence. Her explanation is that "the enhanced ability of employers to continue operations in right-to-work states encourages those employers to take a strike more than the associated greater risk of job loss for strikers in right-to-work states deters unions from striking" (373). It's important to note, however, that this study shares the same identification issues as other RTW papers in that labor law is endogenously determined and perhaps driven by strikes or other union activities. Given the recent uptick in right-to-work laws across the U.S., a more thorough treatment of their modern effects would be a fruitful avenue for future research.

9 Concluding remarks

As we have seen, strikes need not just be the result of asymmetric information or mistakes as earlier research might have led. There can be long-term, strategic reasons, and power asymmetries, solidarity, union identity, and differing interests between union leaders and members that could also contribute to strikes. How collective action is organized in unions is a central issue that has not been seriously tackled by economic researchers thus far. We think that the emergence of solidarity and union identity have been important historically, and attempts such as that of section 6 would be a promising research direction to take.

An important task for the future is learning to identify when each factor is primary and why some become more salient than others at different times.

[12] The relationship disappears in the 1980s, but the authors note that that could be due to President Reagan and the PATCO incident. Also, Ohtake and Tracy (1994) find the opposite relationship for Japan using industry level bargaining data.

[13] For those unfamiliar, RTW laws prevent unions from having union shop provisions that mandate covered workers be union members. It allows workers to partially free-ride on collective bargaining agreements and detach themselves from union activities such as strikes. Currently, 28 US states have such laws.

Not only for academics, but for policy makers and professionals in labor relations such as mediators and adjudicators, it is imperative that we develop a typology of strikes that can help us understand the complicated forces at play. Further research directed at organizing the assumptions and conditions of the causes of strikes and how they relate could be very beneficial to those interested in troubleshooting or preventing industrial conflict. Moreover, the empirical examination of such potential explanations awaits future research.

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