Newly collected data on India’s textile industry over 1921-38 show strike rates far higher than those observed in the British or US industries at a similar stage of development, despite an absence of formal union organization or state support for collective bargaining. Colonial India’s high strike frequency is hard to account for in terms of current theories of strikes and collective action in general. These data may point to the important role of social norms of cooperation in sustaining collective action.
TEXTILE STRIKES IN COLONIAL INDIA, 1921-38

There are many historical studies of strike behavior in the industrialization of the now rich countries. There are almost no quantitative studies of strikes in the initial industrial development of poor countries. In this paper, I examine a rich, and relatively underutilized data source on Indian cotton textile strikes occurring 1921-38. These data provide a unique opportunity to systematically study strike activity in a poor country with a largely unorganized labor force.¹ I develop the first statistics on strike frequency and duration in pre-independence India, and compare these data with comparable historical statistics from the US and Britain. I find that strike frequencies in India are unusually high.

I consider possible explanations of this high strike incidence in light of modern theories of collective action and strikes. Such a study is of obvious interest for labor historians. But there is a wider significance. Exploring the applicability of modern strike theories in an institutional environment far removed from the one for which they were developed will lead to a more thorough understanding of what is universal and what is particular about these theories.

I. THE DATA

India’s modern cotton textile industry began in the city of Bombay in the 1850s, and by the 1920s there were mills in many parts of India. The Bombay City industry experienced consistent growth to 1922, but there was a sharp downturn from 1922 to 1932 followed by a gradual recovery after protective tariffs were put in place. While the Bombay City industry shrank, other centers expanded, both within and without the Bombay Presidency Morris (1965). (The Bombay Presidency was an administrative unit of colonial India. It included most of the modern day state of Maharashtra, as well as portions of the states of Gujarat and Karnataka, and parts of Pakistan.) The main textile centers of the Presidency were Bombay City, Ahmedabad and Sholapur. There were also other mills scattered in smaller cities of the

¹ This study complements other quantitative studies of historical strikes which include Currie and Ferrie (2000), Friedman (1998), Rosenbloom (1998), Card and Olson (1995), and Edwards (1981).
Presidency. Altogether, the cotton textile mills in the Bombay Presidency accounted for three-quarters of cotton textile employment in the subcontinent of India by the end of the 1930s.

The Bombay Labour Office was created after the first world war, and published “full information and complete statistics with regard to all industrial disputes in the Bombay Presidency (Mehrban 1945: 32).” These data were published monthly in the official organ of the Labour Office, the Labour Gazette, and have been cited by many labor historians of India. The data include the name and location of the mill, beginning and ending days of the strike, the number of workers involved directly and indirectly, the cause of the strike, and the result. The way the result was reported varies over the years, with more details being given in the early editions. For example, in the first edition, August 1921, the results of the three completed strikes listed are described as follows: "Unsuccessful. (New men engaged.); Successful. (An increase in the rates and allowance promised for each loom stopped for want of materials.); Successful. (Small increase [in wage] given.)" In later issues, the descriptions are more terse. All that was noted was that "The strike ended in favor of the employers" or it "ended in favor of the workers". But as the results ascribed to the strikes by the Labour investigators appear reasonable in the early years where details are given, I assume they are similarly reasonable in later years.

I am the first to use these data to calculate the number of strikes per year, average strike duration, the total number of days lost to strikes, and the fraction of successful strikes, or rather the fraction recorded as successful by the Gazette. The Gazette data do not include the size of the mill's labor force. To compute strike rates per mill, per worker and per region, days lost to strikes (the number of workers striking times the length of the strikes) per worker and per mill, and measures of mill-wide strike participation, that is, the fraction of the mill’s workforce affected by the strike, I combine the Gazette data with that of the Bombay Millowners’ Association Annual Report. This source lists the names, locations and average annual inputs, including labor, for each of the individual mills in India. Using the mill names and locations from both sources I was able to link the individual mill strike data from the Gazette with data on each mill’s average annual labor force from the Report.
To be interpreted the Indian data need to be put into perspective. There are, however, no similar data from other poor countries. US and Britain from the same point in history, 1920s and 1930s, have aggregated textile strike data which allow me to make some comparisons, such as the number of days lost per worker to strikes per year. But the most similar and comparable data sets were actually collected in the US and Britain in the 1880s and 1890s (see data appendix). Especially important is that these disaggregated 19th century US and British data allow me to construct measures of success and mill participation, as I did for India. And I will argue in a subsequent section that these two aspects of strikes may be especially important in understanding relative strike frequencies across the countries.

Fortunately, the 1880s and 1890s in the US and England are a particularly suitable period for my comparison, better suited than the interwar period if data were available. There are two reasons for this. First, as some studies show that strike frequencies of individual industries rise when that industry’s labor market is slack (McConnell 1990; Tracy 1986), it is better to compare periods with a similar employment pattern. Indian employment in the 1920s and 1930s was steady, with consistent though small growth in the regions outside Bombay City. In the same period employment in England and the US was unstable, affected by the Great Depression and other factors. Employment growth in the 1880s and 1890s in England and the US was growing at a similar rate to those Indian regions outside of Bombay City in the 1920s and 1930s. Second, the legal and institutional environment of the late 19th century in the US and England was more comparable to that of interwar India. I will return to this point later.

II. STRIKE RATES

Table 1 compares descriptive measures of the Presidency strikes to similar measures for England and the US as a whole, and Massachusetts alone for the late 19th century. I separate out Massachusetts because there is evidence that the early US data are somewhat incomplete, and tend to be more incomplete the more remote the area and the smaller the strike (Bailey 1991). The compact Massachusetts industry which was close to major metropolitan areas seemed likely to be fairly complete. The main conclusion one can draw from table 1 is that Presidency strikes were much more frequent than
either English or American strikes. The 19th century cotton textile workers in England struck 0.8, and those in the US 1.4 days per year. Even in the turbulent interwar period, the English days lost to strikes per worker in cotton textiles rose only to 1.8 days per year, while the US figure was slightly higher at 2.36 days per year. But the figure for the Bombay Presidency is 23 days per year. Many of these strikes occurred in Bombay City. But even in the upcountry where employment growth was continuous, each worker could expect to strike over 6 days per year, much less than in Bombay City, but much more than in the US or England. Similarly, each year 28 percent of all mills in the Bombay Presidency and 15 percent of mills in the upcountry experienced a strike, compared to about 3 percent of 19th century English and US firms. The more complete data for Massachusetts only brings up the rate to 7 percent. About 4 percent of workers were typically involved in a strike each year in the 19th century in the US and England. The massive restructuring of the interwar US and English industries brought that measure up to 10 and 9 percent, respectively. In the Presidency, that figure is 41 percent; it is 17 percent on average in the economically healthy upcountry firms.

The disaggregated data on Indian and late 19th century British and US strikes are useful for revealing the relative nature of Indian strikes. The table shows that the average strike in the 19th century US was not that different from those in any of the regions of the Presidency. Average and median lengths were similar. Success rates were similar. On the other hand, both US and Presidency strikes were a bit shorter and much less successful on average than those staged in England.

But note how Indian strike participation compares to that in the US. The typical Indian mill is about five times the size of the typical mill in the late 19th century US or England. This should decrease the ability of Indian strikers to bring out a large fraction of the mill. It did not. The median strike in heavily unionized English mills did have 100 percent participation. The fairly strong unions of Massachusetts, however, achieved only a 10 percent median. The Presidency overall achieved a median of 30 percent, and there was a very surprising 71 percent median in the upcountry. The isolated upcountry mills were the least likely to have formally organized labor unions; workers there had the fewest opportunities outside of agriculture, and these mills were among the largest in the data set.
Solidarity translated into labor victories, at least in India. Table 2 reports the mean and median participation rates and length of strike for the set of disaggregated strikes broken down by strike outcome. These outcome categories were determined subjectively by bureaucrats in their respective country. However, Card and Olson (1995: 33), examining a subset of the 1881-1886 US strikes from the Labor Commissioner’s *Reports* which is also my source for US data, found that wage strikes which contemporaneous bureaucrats classified as a “success” were in fact associated with significant wage gains, while failed strikes tended to be associated with no wage change. Card and Olson also found that in wage strikes in the US the fraction of a firm’s labor force involved in a strike had a strong positive effect on workers' ability to achieve their demands. The authors speculated that this fraction measured workers' ability to present management with a united front. The figures in table 2 indicate that in India "management wins" were associated with lower average and median participation in all three regions. But in England strike participation is nearly unity regardless of outcome. In the US textile strikes, "compromise" results were associated with higher average and median participation rates, though not "labor wins". There is no pattern in Massachusetts. But there is an interesting pattern in the US and Massachusetts comparing union authorized strikes to all strikes. Sixteen percent of US strikes overall, and 15 percent of Massachusetts strikes were union authorized. These strikes come much closer to Indian participation rates. And in Massachusetts, union authorized strikes approach English success levels.

To get a more exact estimate of the effect of labor participation on strike success in India, I estimated probit equations of the probability of a strike ending with something other than a "management win" for each region. These regressions included strike participation, strike duration and year dummies. The results are reported in table 3. The estimated signs on the coefficients confirm what the aggregate statistics suggested. Strike participation increases the probability that management will not win, and strike duration has very little effect on result. The estimated coefficients for strike participation are statistically and qualitatively significant both in Bombay and Ahmedabad. The estimated probit coefficients suggest that in Ahmedabad, as participation moved from 41 to 80 percent, the probability that management would not win moves from 15 to 20 percent. In Bombay the result is slightly stronger. As
participation moves from 35 to 89 percent, the probability that management will not win moves from 15
to 25 percent. The estimated coefficient is smaller and not significant at standard levels for the upcountry
regions of the Presidency. But one might speculate that this is because in those regions, just as in the very
heavily unionized English industry, strike participation was very high in all strikes.

The disaggregated strike data also allow me to estimate hazard functions. The hazard rate is the
probability of a strike settling on a particular day given that it has lasted to this point (Kiefer 1988). It
allows a fuller comparison of strike duration patterns than is possible from just the descriptive statistics
given in table 1. Figure 1 graphs estimated hazard functions for 19th century England, Massachusetts,
and the interwar Bombay Presidency. I have also included Kiefer’s estimate for modern US strike data
for comparative purposes. Kiefer’s data pertain to all US manufacturing industries for the period 1968
through 1976 and cover official strikes involving 1,000 workers or more. The hazard functions are
estimated by imposing a Weibull distribution on the strike duration data. The Weibull is written as:

\[ \lambda(t) = \gamma \alpha t^{\alpha-1}, \]

where \( \lambda \) is the hazard rate as a function of \( t \), and \( \alpha \) and \( \gamma \) are parameters. A higher \( \gamma \) shifts up the intercept
of the hazard function, and a higher \( \alpha \) decreases the absolute value of the slope. That is, a higher \( \gamma \)
suggests strikes will more likely settle sooner, and a higher \( \alpha \) (in the limit equal to 1) suggests that strike
settlement rates are less negatively duration dependent, that is are less negatively affected by strike
duration. The estimate for the modern data are \( \alpha=0.92 \ (0.09) \), \( \gamma=0.03 \ (0.01) \). For England \( \alpha=0.65 \ (0.02) \),
\( \gamma=0.07 \ (0.01) \). For the US, \( \alpha=0.75 \ (0.03) \), \( \gamma=0.07 \ (0.01) \). For the Bombay Presidency, \( \alpha=0.88 \ (0.02) \),
\( \gamma=0.11 \ (0.01) \). Standard Errors are in the ( ). Note that we cannot reject the hypothesis of no duration
dependence in the modern data (\( \alpha \) is not statistically different from one), but we can do so in each of the
three historical series.

A high hazard rate indicates a high probability of settlement. The Presidency hazard rates are
virtually identical to the Massachusetts rates. The figure indicates that in all three historical series, strikes
were much more likely to settle in the first week than do large modern strikes. But after two months,
strikers in Massachusetts and the Bombay Presidency were just as tenacious as modern strikers. After the first 10 days, English strikers were more tenacious than modern strikers. The estimated hazard rates certainly do not indicate a lack of discipline among the Indian workers, at least not relative to 19th century Massachusetts textile workers.

Table 4 has aggregate measures of the annual series of days lost to strikes per worker per year for the Bombay Presidency, England and the US. The worst years in the US and England over the entire period have only slightly more days lost per worker than the median year in the Bombay Presidency. The median annual days lost to strikes per worker in the Bombay Presidency is 4.83. The maximum days lost in England was 7.38. The US maximum is 9.25 days lost per worker. The maximum value for the Bombay Presidency is 133.

Compare the averages and medians in table 4. Averages of these measures are greatly affected by the few very large strikes. Medians are best at indicating typical strike activities. For England, the annual average of strike days per worker is relatively the same in the interwar period and the late 19th century; the interwar median is lower. The interwar annual average of strikers per worker is much higher; the interwar median is again lower. For the US, both strike days per worker and strikers per worker annual averages and medians are higher in the interwar period than in the late 19th century. But the differences across periods within countries are dwarfed by the differences between the Presidency and the US and England in either period. For example, though days-lost-per-worker in the interwar US is 40 percent larger than the same measure for the late 19th century US, the Presidency measure is 10 times the interwar US measure. As both average and median measures are substantially higher in India, these data suggest that India had both more severe multimill strikes, and struck more frequently in typical years.

III. HOW TO EXPLAIN INDIAN WORKERS SINGULAR ABILITY TO STRIKE?

The data tell us that Indian workers engaged in more frequent strikes than did their counterparts in England and the US. They did so in Bombay City, where employment was declining, but they also
struck more frequently in the expanding upcountry. Further, they struck in what appears to have been an organized fashion, at least relative to US workers.

How can we explain this? Why strikes occur at all is not obvious. They involve great cost to the individual and the, uncertain, payoff constitutes a public good for the workforce of the firm. Any gains for workers garnered by the strike are available to striking and non-striking workers alike. Each individual would have a strong incentive to free ride on the efforts of others, and if the labor market is perfectly competitive and workers can move freely across firms, it should be hard to sustain a coalition of striking workers. Even if workers could somehow combine into an organized force, strikes waste resources, and thus should not occur. In explaining why Indian workers struck so frequently, I will consider the role of politics, and also economic models of asymmetric information. In the latter section, I will particularly explore the role of union leaders in eliminating uncertainty, and the role of social norms of reciprocity in sustaining collective action.

**Political Explanations**

One explanation of why strikes occur even if they waste resource is that they are an expression of “collective voice”. Strike frequencies and durations are explained by the complete behavioral context, not excluding economic forces, but also including social measures such as the degree of management’s challenge to fairness and legitimacy. Discontent and social solidarity cause strikes (Godard 1992).

Discontent and solidarity might have been on the rise in interwar India because of increased political activism during the thrust toward independence. Perhaps the relative frequency of Indian strikes was a manifestation of the politicization of the Indian workforce. Only three of the over 1000 strikes are listed as having political causes, and the longest of these lasted just four days. But Tilly (1989: 11)

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2 One potential link between politics and cotton textile strikes can be ruled out easily. In the annual meeting of Congress in December 1920, Gandhi declared a boycott of all things British, specifically highlighting imported British cotton cloth. Indians were to rely on *svadeshi*, or native, cottons, preferably hand woven cloth made from hand spun thread. One might think there was a connection between the boycott and Indian labor unrest. But the majority of the Bombay City millowners were themselves Indian, and foreign millowners outside of Bombay city were very rare. And the Bombay City mills with foreign owners had no greater degree of strike incidence than those with native owners. It is more difficult to check the relationship between the nationality of managers and strike
writes that even so-called “economic” strikes, which he acknowledges constitute the vast majority of
strikes, have a political aspect. “The political implications of strikes lay rather in their legal context, their
tendency to rise and fall as a function of the political strength of labor, and their potential as a weapon in
regional and national struggles for power.” [Italics mine.]

But the importance of nationalist politics in the relative frequency of Indian strikes is not obvious.
Strikes feature prominently in many discussions of Independence agitation, but it seems more likely that
strikes were used opportunistically by Nationalist leaders as a weapon in their political maneuvering than
that strikes were directly caused by political issues. First, political agitators were not vital in leading
labor. There were political leaders who became involved in labor disputes. But an examination of any of
the strikes shows that these were not cases of politicians mobilizing workers. Rather the workers initiated
strikes, and once they had begun, political leaders either volunteered, or were requested by the workers to
represent them. Chadavarkar (1998: 266-326) claims that nationalist agitators exaggerated their role in
workers’ resistance. He believes workers’ solidarity stemmed from workers’ own growing perception of
their shared economic sphere.

One might still argue that the nationalist movement contributed to this perception. Haimson
(1989: 525) argues that there is a connection for workers between “the issue of control over the character
and pace of their own work and their position in the polity as a whole.” But can the increase in political
agitation in India explain strike incidence in India so much greater than in interwar Britain and the US?
The interwar period was a time of heightened political tension and rising labor consciousness in those
countries as well. Freeman (1998) credits the unusually strong 1930s spurt in unionization in the US and
elsewhere, including the United Kingdom, to a widespread “loss of faith in business leadership.” That the
political environment generated by the Nationalist movement increased Indian workers willingness to
strike seems possible; that it raised it such an extent that they were 10 times as radicalized as the fairly
radical interwar British and US workers seems less likely.

incidence. But Rutnagur (1925) lists the nationality of the managers of Bombay City mills for that year. The 28
mills listed as having a foreign manager out of the 77 Rutnagur lists do no have more strikes in the 1920s.
Asymmetric Information

If politics alone cannot explain the greater Indian strike frequencies, what are the potential economic explanations? Most labor economists now argue that strikes occur between industrialists and organized labor when there is a breakdown in bargaining due to asymmetric information (Kennan 1986; Kennan and Wilson 1989). A strike is viewed as a mechanism that credibly conveys information to the less informed party. Employees cannot be certain of the marginal profit of labor. Employers cannot be certain of the reservation wage of labor. Neither side can be certain of the other’s delay cost of striking, nor of their degree of selfishness nor their subjective evaluation of equity. Strikes are not a waste of resources. They are a justified expenditure.

When striking workers are not members of an established union, uncertainty is increased for two reasons. Ashenfelter and Johnson (1969) stress the role of the relatively well informed union leaders in conveying information concerning actual business conditions to the rank and file. In their model, strikes occur because the union leaders do not have complete credibility. But in the absence of unions, this conduit for information is entirely absent. Uncertainty regarding business conditions would be exacerbated. Further, the absence of a secure union presents an entirely new source of uncertainty. In these cases, the strike itself may be being used to resolve workers’ uncertain collective bargaining status. Card and Olson (1995) first pointed this out in their study of late 19th century US strikes.

Card and Olson argue that a particular type of asymmetric model, war-of-attrition models, are most appropriate for explaining the behavior of firms and workers as workers establish credibility in bargaining. When strikes occur with little or no control by an established union leadership, it is not clear what percentage of the work force would support the strike, nor how long they would support it. This uncertain support can be modeled as the strikers’ uncertain delay cost. In the war-of-attrition model, each player has a delay cost which is known only to him; the other player only knows the distribution of his opponent’s delay cost. In the formulation considered by Card and Olson, the marginal cost of delay is constant so that for player i with a daily delay cost of \( c_i \), the cost of a strike of duration \( t \) is \( c_i t \). A player continues the fight so long as the total expected delay costs in the future are less than or equal to the value
of the “prize” that is being fought over. When applied to strikes, the prize can be considered as the higher wage being asked for, the avoidance of a wage decrease, or any of the other conditions labor is asking for, or rebelling against. A strike ends when at least one of the players capitulates. The player with the lower delay cost always wins, and thus the strike outcome resolves the initial uncertainty over relative delay costs. It is interesting that war-of-attrition models are the only asymmetric information strike models which predict duration dependence. In the other models, settlement rates are independent of duration (Kennan and Wilson 1989: s98).3 And as it was noted earlier, in the historical series, the estimated hazard rates have a statistically significant negative slope, and thus exhibit duration dependence.

The relative difference in delay costs between the bargaining players affects strike incidence in war-of-attrition models. Nalebuff and Riley (1985) prove that in war-of attrition models where one player’s delay costs are much larger than the other’s, the former will be “very passive” in comparison with the latter, though this passivity will result in zero strikes only for certain distributions of the delay costs. Intuitively, though exact delay costs are unknown to the other player, if both players know that the distribution of player one’s delay costs lies largely above that of player two, the low probability of success for player one would greatly decrease the expected value of his gains from a strike, and consequently strikes would seldom be worthwhile for player one.

These models suggest that the relative frequency of the Indian, English and US strikes should be explained by either differing levels of uncertainty in the three countries, or factors which altered the relative delay costs of the two parties to the strike. It is unlikely that an absolutely higher underlying level of uncertainty regarding business conditions was responsible for the high Indian strike incidence in the 1920s and 1930s relative to the US and England in either period. These countries' industries each operated in a very competitive international market, and thus the underlying business shocks in the 1920s and 1930s in India, England and the US were similar. India adjusted best to these shocks, as indicated by

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3 Kennan and Wilson (1989) site Milgrom and Weber (1985: 622) on this point. Milgrom and Weber show that the hazard rate of the distribution of equilibrium quitting times is inversely related to the function mapping observed waiting times to types. As the length of the dispute continues, only low delay cost (high prize value) types remain, and so the hazard rate (the conditional probability of settling) falls.
the less severe variations in employment. And the steady employment growth of the US and England in the 1880s and 1890s suggests that these years generated less business uncertainty than the 1920s and 1930s. But I will explore the institutional framework and social environment of the three countries to identify factors which may have mitigated information asymmetries or facilitated collective action and thus altered strike incidence even in the presence of similar underlying levels of uncertainty.

The legal environment

An obviously relevant factor is the legal environment. Governments set the rules of the game. If the institutions favor workers, then workers' expected prize rises, and *ceteris paribus* one would expect more strikes. The first laws governing collective action in India date from the interwar period. In the Bombay Presidency, legislation formally legalizing strikes and unions did not appear until 1926. And even though unions were now legal, firms were not required to recognize or negotiate with them. Government mediation occurred on an ad hoc basis (Kumar 1961). Bombay Presidency workers could not expect a regular role for government in disagreements until the Trade Disputes Conciliation Act of 1934. And this Act merely provided for the creation of a Labour Officer who would meet with workers and millowners. He had no power beyond his power to persuade (Pryde 1945).

We can compare this environment to England. English unions had achieved a relatively secure legal position fairly early. Unions and strikes were legalized in the Union Act of 1870, which also allowed workers to coerce others to strike, if this was done in a nonviolent manner. (Heckling was ruled violent.) Unions’ powers were greatly increased by the Trade Disputes Act of 1906, which allowed peaceful picketing of any type, and guaranteed that unions were no longer legally liable for breaches of contract, i.e. strikes. Around this time the National Board of Trade became involved in arbitrating industrial disputes (Brown 1982). Both the change in the law and the recognized role of government in mediation greatly strengthened labor’s bargaining power.

Before 1934, unions and strikes in India and the US had roughly equivalent legal standing. Trade unions and striking had been *de facto* legal since the Commonwealth vs. Hunt decision in 1842. Though the case was decided by the Massachusetts Supreme Court, and so was not binding on other states, it was
cited as a precedent (Rayback 1966: 91). The Clayton Act of 1914 formally legalized unions, and gave them at least nominal protection from liability under the Sherman anti-trust laws, though as Rayback (1966: 295) shows the actual protection offered by the Act was limited. The most important point of similarity between the US and India was that management was not required to recognize or bargain with unions in either country. This changed in the US after the creation of the National Labor Relations Board in 1934, and the Wagner Act which legalized the NLRB codes.

The legal environment in late 19th century Massachusetts seems very close to interwar India. According to Bedford (1995) the Massachusetts political and legal community of that period was genuinely concerned with the position of workers. Rayback history shows this concern was not universal among US jurists of this period. But Bedford notes that even the administrators of the Massachusetts Bureau of the Statistics of Labor were somewhat distrustful of unions. This institutional ambiguity was also characteristic of interwar India.

Thus, the legal environment would suggest that workers had the greatest incentive to strike in England after 1906, and in the US in the 1930s. Late 19th century Massachusetts and India might be expected to have similar strike frequencies. That is not the pattern found in the data. Despite an institutional environment not conducive to labor, Indian workers struck with exceptional frequency.4

The gender composition of the labor force.

If one considers only the textile industry, one might conclude not that Indian textile workers struck often, but rather that the US and British textile workers struck seldom. Indian workers were overwhelmingly male, and committed to lifetime employment in the industry. The US and British labor force were more mixed, but were majority female. A large portion of female workers is typically considered a deterrent to strike activity perhaps because their lack of commitment to the industry reduces

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4 This is similar to the result of Currie and Ferrie (2000), who found that the legal environment across US states in the late 19th century had minimal effect on strike incidence.
the expectation of the prize to be won by organizing. But though they were majority female, the textile industries of Britain and the US were among the most militant labor forces in those countries if measured in terms of annual strike days per worker. For the US Edwards (1981: 155) lists the days lost per worker to strikes by each industry, 1927-40. The average days lost per year for the 21 industries listed is 1.3. The figure for all of textiles in these years is 1.6. Only coal, at 1.9 days lost to strikes per worker per year is significantly higher than textiles, but even that figure is dwarfed by the Indian days lost data. For the UK I have constructed decadal averages of days lost to strikes from 1891 to 1938 for selected industries. These averages are reported in table 5. I chose these industries for comparison with textiles because they all had overwhelmingly male labor forces, and were prone to strike activity. For most years, the UK textile industry is as or more strike prone than these other UK industries. And for most years, all of the British industries lost much fewer days to strikes per worker than did the Indian textile industry. The exception is the UK coal mining industry in the 1920s. But the coal mining strike of 1926, in which over a million miners participated, and which precipitated the General Strike of 1926, was, according to the British labor historian Pelling (1963: 180, 182), “the bitterest conflict between [the union leadership and the government] that the country has ever experienced.” He believed “the loyalty of the rank and file in the General Strike showed the extraordinary strength and influence of British trade unionism.” Note that a UK miner in the 1920s lost almost as many worker days to strikes as a Bombay Presidency textile worker, and about half as many as a worker from the Bombay City industry.

Income of striking workers

A major factor determining workers' delay costs is the income they can earn during a strike. If that income is large relative to their foregone wage, delay costs are lower and, ceteris paribus, there should be fewer strikes. Indian textile workers were virtually all male. Their alternative employment consisted primarily of agricultural work in the upcountry. Male Massachusetts textile workers also turned to agricultural work during strikes (Shlakman 1969: 215). And Hunt (1973: 37) writes that the wages

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5 This lack of lifetime commitment is in fact what I argued in an earlier paper explained the Indian workers more persistant resistance to speed up than the largely teenage female Japanese labor force, and how Turner (1962: 293-
for agricultural workers in Lancaster, England's main textile center, were higher because of competition from textiles. One option for female strikers in the US or England might have been domestic service as it was unskilled and in general demand. Table 6 reports the ratio of the textile wage to that of the alternative activity in each region. In the US and England, textile labor and competing activities earned roughly equivalent wages. This was not the case in India where textile wages commanded a large premium. This large differential in wages would mean a much higher delay cost for striking in India.

Further, support funds were available in late 19th century and early 20th century US and English strikes even for non-organized workers. Turner (1962: 122) writes that the English unions were very mindful of the need to provide even on-unionized workers strike funds to minimize the potential for strikebreaking. Shlakman (1969: 191) notes that in Chicopee Massachusetts, the town would support the families of striking workers through municipal poor relief. DeVault discusses a 1903 textile strike in Lowell Massachusetts. Lowell, just as had Chicopee, gave poor relief to the striking workers (DeVault 2004: 50). The union in Lowell also paid out strike benefits even to workers who had joined the union only after the strike began. The unions in India had no funds for strike relief, and Indian municipal governments did not support the poor. Indian workers struck despite relatively lower alternative incomes.  

**Unionization**

The English labor force was much more unionized than either of the other two. English textile workers had achieved unionization membership rates of more than 50 percent by World War I.6 Roughly 8 percent of Indian textile workers belonged to a labor union in 1924, comparable to US unionization membership rates in textiles of the same period.7 But these Indian unions were typically no more than strike committees with “about as much life as the letterheads which they printed ostentatiously on their notepaper (Chandavarkar 1998: 74).” In particular, these unions had no financial resources to support striking workers or provide any other benefit to workers (Mukhtar 1935).

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6 The British measure is calculated by two estimates of Turner (1962). He gives cotton employment at 700,000 in 1913, and union membership at 400,000 (pp. 22 and 25, respectively).

94) explains the relatively few women present in 19th century English union leadership.
If union leaders played an important role in credibly informing the rank and file as to the true state of business conditions, or if the fact that there was a recognized union resolved some degree of uncertainty regarding workers’ ability to act collectively, one would expect fewer strikes in England. And that is what occurred. It is interesting that of the three countries, English strikes were the longest, most cohesive in terms of the participation of workers, and exhibited the greatest duration dependence. English workers struck less frequently than Indian workers, but showed tenacity when they did strike. If as modern strike theories suggest information asymmetries are important and union leadership can reduce this problem by conveying information, strong union leadership would reduce the incidence of strikes as well as increase discipline during strikes. The English data are consistent with these predictions.

On this point, it is interesting that the one region in India in which there was a strong labor organization, Ahmedabad, lost the fewest worker days to strikes. By 1924 the Textile Labour Association (TLA) of Ahmedabad, originally organized by Gandhi, represented 14,000 members, roughly a fourth of Ahmedabad’s workforce, and that figure roughly doubled by 1930. More importantly, it commanded significant resources, much of which had actually been donated by millowners sympathetic to Gandhi’s political cause. These resources allowed the TLA to involve itself in the day-to-day life of the workers through its many social welfare activities. In this case, the comparatively short duration of the strikes, an average of 5.9 days as opposed to a Presidency average of 9.9, and the relative lack of cohesion by workers in the Ahmedabad strikes, the average being 34 percent of a mill’s workforce participating as opposed to the Presidency average of 46 percent, may counter-intuitively indicate the strength of the union, rather than signaling its weakness. For the union leaders, who were not workers but were educated, middle class supporters of Gandhi, saw their role as mediators between the workers and the millowners, and tried to diffuse hostility. The leaders opposed strikes in principle, and believed they should only be used as a very last resort (Patel 1987; Mukhtar 1935).

7 There were 30,795 union members in the cotton textile industry (Kumar 1961) and 356,867 workers (BMOA Reports). See Wolman (1976) for the US data.
At least one Bombay mill manager held the view that the relatively limited strike activity of Ahmedabad was due to the TLA and Gandhi’s influence. Fred Stones was the manager of one of the largest group of mills in Bombay, the Sassoon group. Testifying *en camera* before the Textile Labour Inquiry Committee of 1938, he stated that he believed that only Gandhi could have averted the devastating general strikes in Bombay of 1928, 1929, 1932 and 1934.

Yes, there would have been mutual confidence on both sides, if things were managed in a different way. The only thing was that if Gandhiji had come down to Bombay to form the Bombay Trade Union Association and had as much influence over the Maratha section of the community here as he had on the Gujarathi section in Ahmedabad, then it would have been worth, I should say, above a crore of rupees (Bombay 1938-40: 3907).

Mr. Stones’ employer, Sir Victor Sassoon, “had instructed him to meet ‘the devil himself’ if he had the confidence of the workers and could deliver the goods.” But though Mr. Stones had met with the titular leaders of the Bombay unions in 1928 and 1934, Mr. Stones testified that “no one could deliver the goods,” and these strikes could not be averted (Bombay 1938-40: 3624, 3908).

One cannot use similar arguments to explain the much lower strike incidence in the US relative to India. US workers were similarly non-unionized and thus similarly leaderless. In general, their strikes were similarly unsuccessful, and US strikers presented an even less united front than Indian strikers. In those limited cases in which the US strike was sanctioned by a union, cohesion and success improved, as discussed earlier. But the great majority of US workers were unorganized, and the great majority of strikes occurred without union involvement. If these conditions led to high strike frequencies in India, why were there relatively so few strikes in the US?

*Model of cohesive behavior.*

Perhaps there was something in the culture of Indian workers which allowed them to mimic unionized behavior in the absence of western style unions? In 1893 Mr. Tom Drewet, a former manager of one of the leading Bombay mills, testified:
The institution known to Western nations as a trade union, with its printed rules and regulations, its subscriptions and regular accounts, is represented here by an unnamed and unwritten bond of union among the workers particular to the people (Great Britain 1893: 132).

What was this bond? Mancur Olson (1965) argues that a group may solve the problem of providing a public good, such as the gains from striking, by providing private benefits accessible only to members. The private benefits create the bond, and the provision of the public good will be almost a “by-product” of the organization. The true loss to members from not participating in collective action is not the foregone opportunity of potentially achieving the public good; it is the actual loss of the private benefit. Thus the Webbs wrote in 1897 that “the prospect of securing support in sickness and unemployment is a greater inducement to join the union … than the less obvious advantages to be gained by the trade combination (Booth 1995: 71).” But Indian unions furnished little more than nominal oversight of strike committees. Historians describing the Indian labor force stress the social networks which bonded the workers. (Chandavarkar 1998 and 1994, Newman 1981 and 1979, van Wersch 1992, and Patel 1963.) The networks would stem initially from kinship, caste and village ties, and then expand to co-workers and other tenement neighbors. These ties were important in finding a job, sustaining workers before permanent employment, and providing for the worker in any downturn or sickness. They provided insurance in a risky environment, much as did the benevolent society activities of the English trade unions. I will argue that the need to preserve good standing in these networks may have provided Indian workers with sufficient incentive to maintain the cohesion evidenced by the strike data. Consider the case of a worker who breaks with his fellows who have chosen to strike over a wage decrease. Suppose that they win the strike. While it may be true that the strike breaker subsequently receives the same wage as the strikers even though he did not bear the cost of the strike, he will have lost the benefits of belonging to the social network. My arguments fit well with the observations of Mr. J.M Campbell, a former manager of a large Bombay mill. In 1892 he ascribed the bond between the millworkers to:
the threat of boycotting to prevent individual workmen in any branch of factory labour consenting to accept wages lower than what that form of labour has hitherto commanded. This secret influence, though little more than ‘in the air,’ is powerful. I believe it has much to do with the prolonged maintenance of what seems to me a monopoly or almost a monopoly wage (Great Britain 1893: 128).\(^8\)

To formalize this discussion, consider a society of \(n\) workers. The probability of employment is \(p\). If the worker is employed, he receives a wage of \(w\). Assume that the wage available in other employment is zero for simplicity. A proportion \(g\) of the workers belong to a “group”. Employed members of this group donate an amount \(s\) to their less fortunate neighbors. These funds are collected together and dispersed to unemployed group members. Non-members of the group receive nothing. If in any period a worker who is employed refuses to share, he is outcasted from the group and does not have access to the donated income in subsequent periods of unemployment.

Suppose for simplicity that the workers are infinitely lived. (This assumption is justified because death occurs randomly and without forewarning and because in Indian society one’s standing with the group determines one’s children’s standing with the group. Reputations outlive individuals.) Those workers who are not a member of the group, denoted \(\text{out}\), receive a wage \(w\) if employed and 0 if they are unemployed. Their expected income in each period is given below.

\[
\text{ExpIncome}_{\text{out}} = p \cdot w + (1 - p) \cdot 0 = pw.
\]

The members of the group, denoted \(\text{in}\), receive a wage \(w\) if employed and a share of the donated income if they are unemployed. Their expected income is:

\[
\text{ExpIncome}_{\text{in}} = p \cdot (w - s) + (1 - p) \cdot \frac{p \cdot g \cdot n \cdot s}{(1 - p) \cdot g \cdot n} = pw.
\]

Note that the amount shared out of wages, \(s\), does not affect the value of expected income. Thus, if the workers are risk neutral and only concerned with the level of their expected income, they will have no incentive to share (or not to share).

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\(^8\) Of equal interest for my argument is that Mr. Campbell contends that the workers are likely to form a union soon as they already exhibit union like behavior. “Individual workers allow their wages to be cut for objects which their
It is reasonable to argue, however, that in the situation of extreme poverty and minimal savings seen in India, textile workers would not be risk neutral, but would rather be risk averse. Then the standard result would obtain that the expected utility from an uncertain income, as opposed to the expected income itself, would be greater in a situation of sharing than in a situation of non-sharing. Risk aversion occurs because the marginal utility of income is diminishing. Thus the expected utility from receiving \( w \) with probability \( p \) and 0 with probability \( (1-p) \), for all potential values of \( p \), must lie below the expected utility of receiving at minimum something above 0, even if that means the maximum will be something below \( w \), as would occur in a sharing situation. Expected utility for the risk averse is greatest when \( s \) is set equal to \( \frac{1}{2} \) of \( w \), that is income is the same whether the worker is employed or unemployed.

Risk averse individual’s discounted expected lifetime utility will be higher for group members than for non-group members because each period’s expected utility is greater for members than for nonmembers. Therefore the discounted sum of each period’s expected utility must be greater for members than for nonmembers. As long as this difference in discounted expected utility streams is greater than the benefit of cheating in any one period, where cheating is defined as a group member refusing to share, and as long as all parties expect all other parties to share, and punish anyone who does not share, sharing will be a mutual best response.

It is easy to incorporate even costly participation in other group endeavors into this framework. Strikes are one example. Suppose the “group” chooses to strike. As before, let the cost of a strike of duration \( t \) to an individual be \( c_i \cdot t \). As long as this cost is less than net value of the discounted stream of expected insurance payments in subsequent periods, group membership will still be optimal, and so the worker will join with his group in the strike.

The model fits well with several surprising aspects of Indian strikes. For example, note that in this model workers would be indifferent between employment for all, and just some workers receiving a very large value of \( w \). The “group” tries to maximize the total wage bill, not individual wages. Most caste or community hold worthy of support. A meeting is called and subscriptions collected to repair a rest-house, dig a well or reshrine a god in some up-country village.”
empirical studies of Western trade unions reject pure maximization of the wage bill as an objective, and attribute that rejection precisely to the difficulty of sharing income even within these formalized institutions (Farber 1986). But the data cannot reject that maximization, or at least maintenance, of the total wage bill was a goal of Indian workers. In previous work, I analyzed the failure of interwar Indian management to profitably imitate the labor productivity enhancements of their Japanese competitors (Wolcott and Clark 1999). I argued that the reason they were unable to do so is that the payment to the workers for higher effort seemed to largely eliminate the gain from productivity improvements. That is, even though required labor per output fell, the wage bill did not.9

Also, the model suggests that the labor force would exhibit be most cohesive firm-wide behavior for those cases in which the group is large relative to the society of workers. The "group" is those workers who have ties of mutual obligation. In the large cities, not all workers at a mill would necessarily be interconnected socially. But mills in the outlying regions were pulling on local labor. There, the mill's entire labor force would be an interconnected group. I take it as support for the model that strikes lasted longest in the upcountry, for an average of 16.8 days versus 11.4 days in Bombay City. And similarly, in the upcountry strikes were able to bring out the largest fraction of the mill’s workforce, a median of 71 percent versus 40 percent in Bombay City.10

Finally, the model indicates that workers total incomes, which includes group supplements, will remain stable in the face of disturbances such as unemployment or strikes as long as the group’s overall resources are large relative to the foregone income. I can cite two cases in which this appears to have held. The Office of the Labour Commissioner for the Central Provinces and Berar collected budget data for textile workers in Nagpur between Dec. 15, 1941 and Aug. 10, 1942. Due to the accidental loss of 121 budgets of textile workers, a second set of budgets was taken in the latter half of 1942. There was a

9 Of course, the equivalence of a high w and low employment and a low w and high employment in the model would be eliminated by the inclusion of a small transaction cost of sharing. As long as the transaction cost were less than the monetarized gain from insurance, which is a function of the individual’s degree of risk aversion, purchasing insurance by sharing in good periods would remain the equilibrium strategy.
strike from the 15th of August to about the 10th of October, 1942. “As regards the expenditure of these 121 families, it does not seem to have been affected by the strike. In fact, it turns out to be practically the same as that of the remaining 291 textile Mahar families (India 1944).” The Bombay Cotton Textile Strike of 1982-83 studied by van Wersch (1992) had a similar effect on workers’ incomes. Though it occurred some fifty years later, in many ways this strike paralleled the General Strikes of the interwar period. It may seem odd to assume that the behavior of workers in the 1920s and 1930s would be similar to that of workers in the 1980s, but I believe it is justified. The workers still came from roughly the same villages. They still followed roughly the same pattern in terms of the ages they arrived in Bombay, how they found jobs, housing and support once in Bombay, and even how they distributed their money between expenses and remittances. Among his sample of 150 workers, van Wersch (1992: 343-44) found that 37 percent did not experience a “change of lifestyle” during this very protracted strike. Two methods by which the mill workers managed this mimic my model. First, strikers survived by returning to their villages or by borrowing from their city neighbors and by obtaining credit from their usual grain merchants. They borrowed from their group. Another way workers survived the strike is they worked in cotton textile mills, but not their mill. This was apparently not considered strike breaking. My model would have predicted that, but a model of class cohesion, for example, would not. Class cohesion requires workers to support the interests of their class; in my model, workers are only loyal to their immediate group.

Social organization in interwar India and late 19th century Massachusetts

In the model presented above, sharing is one sustainable equilibrium. Not sharing at all would be another. Bendor and Swistak (2001) determined that some degree of cooperation may be sustained in the absence of binding institutional supports if there is a sufficiently dense social network so that everyone knows who has cooperated and who has not, if there are sufficiently severe penalties for cheating, and if punishment is multilateral; a failure to cooperate with any one individual must lead to retaliation by the

10 One might conjecture that the length and cohesiveness of upcountry strikes might be due to underreporting in the outlying areas. Perhaps only the more severe strikes are being reported. This appears to be unlikely as the percent
entire group. The level of cooperation chosen will depend upon what players expect other players to do. Greif (1994) pointed out that these beliefs, which he models as players’ \textit{a priori} probability distribution over potential equilibrium strategies, depend upon existing norms predetermined by culture. This model can only explain the higher relative strike frequencies of India compared to the US if the culture of Indian workers predisposed them toward cooperation both in terms of sharing income and in terms of group punishment more so than did the culture of US workers.

Late 19th century New England textile workers, at least, were a disparate group of native born and immigrants from different countries. I will refer again to DeVault's discussion of the Lowell Massachusetts 1903 textile strike. The labor force included native born men and women, French Canadians, Greeks, Portuguese, Polish, Armenians and Syrians. She describes how each group lived separately within Lowell. And though all supported the strike, they always met first in their respective ethnic or gender groups. For another strike, this one in 1898 New Bedford, she makes a similar observation. "Both gender and ethnicity overlay and were intertwined with occupational, organizational, and political differences." (DeVault 2004: 180) Accordingly, even in small New England textile towns, group loyalty appears to have been divided along gender and ethnic lines.

The limited interactions across ethnic lines necessarily limited the scope of group punishments across ethnic lines. Perhaps the most explicit indication of this is the widespread use of immigrants as strike breakers in the 19th century US. Rosenbloom (1998: 184) quotes Philip Foner on this point.

The failure of a great number of strikes in the cotton textile, mining, iron and steel, cigar, railroad, and other industries must be attributed in no small measure to the ability of employers to make use of unskilled labor obtained from the labor exchanges and steamship companies as strikebreakers. While Rosenbloom notes that strikebreakers were certainly not limited to newly arrived immigrants, they were an important source. Shlakman (1969: 219) writes that Greeks were brought in as strikebreakers in a 1906 textile strike. And DeVault (2004: 122) writes that French Canadians were strikebreakers.

of 1 and 2 day strikes in India as a whole was 17. In the upcountry, however, it was 21.
What of Interwar Indian mill workers’ social norms? Their cultural beliefs were formed in their villages. Even in Bombay Island, the most urbanized area in India, as late as 1931 only about 25 percent of cotton textile mill hands had been born in the city. (Morris 1965: table 8) Indian village life was highly stratified spatially and socially by caste groups (Marriott 1955). While it is well known that individual castes provide income support for their members (Srinivas 1962), and Munshi and Rosezweig (2006) show the importance of individual caste groups in the social insurance networks of industrial workers in modern Bombay, the mills in my study employed workers from many castes. Successful strikes would require cross-caste cooperation. The pronounced caste divisions present in Indian villages might suggest they would be infertile ground to look for the formation of attitudes of general cooperation. But anthropologist Pauline Kolenda (1978) argues that in the villages of colonial India, the caste system provided “organic solidarity”. Within the village, and extending beyond in economic systems which included other nearby villages, the castes were interdependent. Each had a protected role in the economic order and a claim on the wealth produced by the village. This relationship is called the jajmani system in much of India, and the baluta system in Maharashtra, the state which includes Bombay and from where the majority of the Bombay textile mill labor force was drawn.11 While a full discussion of Indian village conventions is obviously outside of the scope of this article, I wish to establish here that sharing income within the village was the norm, that there were accepted methods of informally adjudicating deviations from social norms, and that punishments for these deviations was multilateral.

The most important form of income sharing was the money lending which was ubiquitous in village India. The wealthy were expected to lend money. And while they quite often profited from this activity, they were also expected to grant extensions in difficult periods (Mayer 1965). found a similar pattern in modern India. In a study of income smoothing in South Indian villages, Rosenzwieg (1988) reports that informal loans from wealthy farmers, employers, shopkeepers, etc., were an important

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11 Colonial Indian villages and the divisions of labor which existed there have been variously described as "moral" and "exploitative". Determining which description is more accurate is a major issue in Indian history and historical anthropology (Appadurai (1984), Dirks (2001)). But the morality of Indian conventions, though of obvious inherent
component of average expenditure, equivalent to approximately 58 percent of the value of mean profits
from crop production. Further, these loans, typically intravillage, were more than 4 times as large as
transfers from extended family relations. Kinship and caste ties were significant, but not quantitatively as
important as village ties.

Many historians and anthropologists (Chakrabarty ; Newman 1979; Rowe 1973) argue that Indian
workers recreated village institutions in urban mill compounds, including patronage networks.12 Newman
(1979) argues that the jobber, the person responsible for staffing the mills, was the main agent of
patronage. Jobbers sometimes went into the village to recruit, but all that was usually necessary was that
he be "known in the village". Newly arrived workers would come to him in search of work, lodging and
credit. "In practice, therefore, each millhand was part of a limited labour market that operated through
personal relationships as well as through a cash nexus, a labour market that was bounded by verical ties of
patronage." (Newman 1978: 282) Newman argues that personal ties to jobbers explain why workers
tended to enter or leave employment in groups, and also why the ubiquitous badlis- new migrants to the
city hoping to become textile workers but not yet employed- could not be successfully used as
strikebreakers.13 Mukhtar (1935: 15) wrote that though millowners had tried to break the kinship and
village ties of workers by bringing in workers from outside, "the newcomers usually joined the rank and
file shortly after their arrival." In Bombay, the workers had to associate themselves with a patron.
Newman argues that the natural patron to associate themselves to was the jobber.

It should be noted, however, that the existence of jobbers' groups cannot by itself explain strikes.
Bellwinkel (1973) surveyed construction labor groups in Delhi, 1970. The recruitment proceeded just as
Newman outlines for interwar textile workers, and workers were very loyal to their jobber. Jobber groups
lived together in the site compound, cutting across village and caste connections. But in construction,

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12 Chandavarkar (1994: 174, fn 15) lists others who hold this view. He himself feels it is overdrawn.
13 Large numbers of unemployed workers would appear at each mill each morning in Bombay City. A manager
noted in 1927 that 50 or 60 workers would congregate each day at his mill's gate (Morris 1965: 137). While 50
management was able to pit one jobber group against another to limit strikes. I am aware of no similar cases of strikebreaking "groups" in textiles.

The transient nature of the construction compounds versus the more settled mill apartment blocks may partially explain this. Chandavarkar (1994) argues that the mill neighborhoods formed cohesive, supportive communities. He also writes that neighbors dispensed justice as well as credit. In some cases the apartment block or chawl would form a committee to represent tenants in disputes with the landlord or to settle disputes between neighbors. They were headed by the most influential members of the block, and had the right to not only settle disputes, but to fine individuals violating the community norms. Chandavarkar (1994: 186-87) writes that it is clear that "communal sanctions were impressive and the administration of informal justice in the neighbourhood widespread."

These urban committees were also a transplant from the village. There each caste had its own panchayat, or council, over which the headman of the caste officiated, and disputes across castes would typically be brought to the "influential people of the village." (Majumdar 1958: 99) Cases taken up by the caste-panchayat deal with personal matters which would lower the reputation of the caste, such as irregular unions and family quarrels, with land disputes, and with other disputes between caste members (Majumdar 1958). Hutton (1963: 89) writes that "poaching on the ‘practice’ of a fellow-casteman would be a proper subject for the caste panchayat.” The panchayat had other functions such as planning community festivals, reforming the sub-caste, or jati, customs, and one which I thought was particularly relevant, “developing community strategy for dealing with the dominant caste, or with the police, or government agents.” (Kolenda 1978: 89) (The “dominant caste”, a phrase which was apparently coined by M.N. Srinivas, is the caste which holds political and, typically, economic sway over the village.) The decisions of the panchayats are upheld by the group. The punishment meted out for grievous violations of caste rules is to “deprive a casteman of the right to receive water, or the tobacco pipe, from the hands of his fellow castemen and forbids them likewise to receive it from them.” This effectively expels him

would not satisfy the labor needs of these large mills, if the city were a unified labor market, and not segmented as Newman argues, there were sufficient numbers of unemployed in Bombay to break any individual mill strike.
from the community. He will not receive help in time of difficulty. There will be no one for his children to marry (Hutton 1963: 106). Kolenda (1978: 11) writes that the resulting “social control of members is unusually strong and effective.”

Ranajit Guha (1983: 190-91) illustrates how the Indian social system I describe supported mass resistance in the Pabna peasant uprising of 1873 and the Deccan riots of 1875, both against moneylenders. Guha writes that the unity of the villages stemmed from the threat of physical and cultural sanctions. The latter were threats of loss of status, and in the limit social boycott "which would ruin a peasant economically as well as socially". In the Deccan riots, for example, agricultural laborers were warned that if they worked for a money lender, no village servant would provide them with services. Guha notes that two workers tested the limits of these restrictions. They came from their home village looking for work. "The Patel [headman] and Kulkarnees [village accountants] are threatening to drive us away and to beat us in case we continue to serve the Guzars… We have also been warned that the community will put us out of caste."¹⁴

Sharing income and social ostracism of strikebreakers is certainly not unique to India. And anecdotal accounts of strikes among unorganized workers in interwar India do not differ markedly from anecdotal accounts of strikes among unorganized workers in the US.¹⁵ But the systematic strike data show that Indian strikes do differ markedly relative to other countries in their frequency and in worker cohesion. The model shows that this unusual behavior could be supported by social norms of cooperation and multilateral punishment for norm-violators depending on the degree to which social norms bind behavior. In colonial India, anthropologists describe networks of informal credit and means of informally adjudicating disputes, where decisions were upheld jointly by these same networks with high penalties for defection. Anthropologists argue that social norms in India were unusually binding. The evidence left by

¹⁴ Wade (1988) tells of how these social sanctions facilitated provision of communal irrigation in rural India.
¹⁵ For example, Lahne (1944: 217) describes cooperation among striking Southern cotton textile workers in the 1930s which went far beyond the limited financial means of the formal union. Among other things, Southern strike breakers used their wages to support the strikers.
19th century Indian peasant uprisings show us explicitly that these norms could contribute to collective resistance. It seems reasonable to conclude that they may also have facilitated strikes.

CONCLUSION.

Indian interwar textile workers exhibited an impressive ability to act collectively in bargaining with employers. They struck 10 times more frequently than other comparable workers, while maintaining a high degree of group cohesiveness as indicated by strike length and percent of the mill participating in strikes. And workers maintained this cohesion without the formal commitments of western style labor unions, and with only minimum government support.

One explanation for the high strike frequencies consistent with the data is that Indian workers had a low cost of cooperation but there were no recognized labor leaders to negotiate their demands. The Indian workers appear to have formed groups which were tightly knit but leaderless. These groups had the effect of decreasing the delay cost of striking without providing management with a responsible negotiator. This notion is given some support because the one region in India with effective labor leadership, Ahmedabad, actually evidences the fewest worker days lost to strikes. What sustained the groups in India? At least theoretically they could have been sustained by an unusually high cultural norm of cooperation created and reinforced by the need to supply social insurance. Historians describe the informal credit networks of Indian workers, and anthropologists describe the means by which these same networks can bind behavior. Thus that theory is consistent with the historical record of Indian workers.

What can these historical Indian strike data suggest about the general applicability of modern strike theories? First, they reinforce the notion that credible labor leadership can actually play a positive role in decreasing strike incidence. A second point is that the absolute level of uncertainty may be less important in determining strike incidence than are the particular cultural norms of the workers, for these norms determine how workers coalesce in an uncertain environment.
Appendix. Data Sources for the US and England.

US data come from various sources. Data on individual strikes in US mills are available in the 3rd and 10th Annual Reports, of the Commissioner of Labor, 1888 and 1896. These data begin in 1881 and stretch to 1894. They include the location of the striking mill, the number of workers directly and indirectly affected by the strike, the beginning and ending dates of the strike, the result of the strike, and the number of workers employed in total by the mill. I also collected information on total employment in cotton textiles and the number of mills from the 1890 Industrial Census. Then for the years 1927 to 1936, Florence Peterson, Strikes in the United States gives data on the aggregate number of strikes, the aggregate workers involved in strikes, and the aggregate man days lost to strikes for the US cotton textile industry. I complete these series to 1938 from later Bulletins. There are, however, no data on individual strikes for the US after 1894. Aggregate US employment data in this period are from various issues of the Census of Manufactures.

The British data are also from several publications. Data on individual strikes become available for Britain beginning in 1888. Data on all strikes were published in the Annual Report on Strikes and Lockouts by the British Labour Dept. in the Parliamentary Papers from 1889 to 1900. But only what the bureaucrats considered important strikes are listed in this report after 1900. The British data for the period 1889 to 1900 include the location of the striking mill, the number of workers directly and indirectly affected by the strike, mill workers not affected by the strike, the beginning and ending dates of the strike, the result and the cause of the strike. I collected data on the aggregate number of workers employed in cotton textiles in 1890 and 1895 and the number of mills in 1890 from the Annual Abstract of Statistics. For Britain there is also a consistent series on number of strikes and the total number of man days lost to strikes, for the textile industry (cotton, hosiery and wool) for the period 1891 to 1938 (Clegg 1964; Knowles 1952). I have combined this with data on the number of workers in textiles from various issues of the Annual Abstract of Statistics to create a series on total number of days lost per worker in Britain.
BIBLIOGRAPHY


FIGURE 1.

Estimated Hazard Functions for Strike Durations

hazard rate

days

Table 1. Comparison Of Cotton Textile Strike Statistics for the Bombay Presidency, England, and the United States

<table>
<thead>
<tr>
<th>Region</th>
<th>Years</th>
<th>mills</th>
<th>workers</th>
<th>strikers/yr/ml</th>
<th>strikers/yr/laborer</th>
<th>strike days/yr/laborer</th>
<th>avg. days</th>
<th>median days</th>
<th>avg. participation</th>
<th>median participation</th>
<th>% success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presidency</td>
<td>1921-1938</td>
<td>197</td>
<td>244,875</td>
<td>0.28</td>
<td>0.41</td>
<td>22.96</td>
<td>9.9</td>
<td>5</td>
<td>46%</td>
<td>30%</td>
<td>32%</td>
</tr>
<tr>
<td>Bombay</td>
<td>1921-1938</td>
<td>73</td>
<td>130,308</td>
<td>0.33</td>
<td>0.59</td>
<td>38.06</td>
<td>11.4</td>
<td>6</td>
<td>52%</td>
<td>40%</td>
<td>30%</td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>1921-1938</td>
<td>68</td>
<td>64,235</td>
<td>0.34</td>
<td>0.25</td>
<td>5.16</td>
<td>5.9</td>
<td>3</td>
<td>34%</td>
<td>26%</td>
<td>34%</td>
</tr>
<tr>
<td>Elsewhere (upcountry)</td>
<td>1921-1938</td>
<td>56</td>
<td>50,332</td>
<td>0.15</td>
<td>0.17</td>
<td>6.60</td>
<td>16.8</td>
<td>8</td>
<td>59%</td>
<td>71%</td>
<td>33%</td>
</tr>
<tr>
<td>England</td>
<td>1889-1900</td>
<td>2538</td>
<td>528,795</td>
<td>0.03</td>
<td>0.04</td>
<td>0.82</td>
<td>21.3</td>
<td>5</td>
<td>98%</td>
<td>100%</td>
<td>66%</td>
</tr>
<tr>
<td>England</td>
<td>1921-1938</td>
<td>1,084,567</td>
<td>0.09</td>
<td>1.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>1881-1894</td>
<td>830.5</td>
<td>198,122</td>
<td>0.03</td>
<td>0.04</td>
<td>1.39</td>
<td>17.1</td>
<td>7</td>
<td>41%</td>
<td>20%</td>
<td>33%</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>1881-1894</td>
<td>181</td>
<td>69,029</td>
<td>0.07</td>
<td>0.06</td>
<td>1.70</td>
<td>13.8</td>
<td>5</td>
<td>33%</td>
<td>10%</td>
<td>38%</td>
</tr>
<tr>
<td>US</td>
<td>1927-1938</td>
<td>396,995</td>
<td>0.10</td>
<td>2.36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Strike participation is the percent of the mill’s labor force which joined the strike. Percent success is the percent of strikes which ended in either a labor victory or compromise.

Sources: See text
Table 2. Strike Participation and Duration by Result

<table>
<thead>
<tr>
<th></th>
<th>percent of strikes</th>
<th>mean participation</th>
<th>median participation</th>
<th>mean length</th>
<th>median length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>England (868 strikes had recorded results)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compromise</td>
<td>28%</td>
<td>98%</td>
<td>100%</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>Labor win</td>
<td>36%</td>
<td>98%</td>
<td>100%</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>Management win</td>
<td>36%</td>
<td>98%</td>
<td>100%</td>
<td>27</td>
<td>7</td>
</tr>
<tr>
<td>US (366 strikes had recorded results)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compromise</td>
<td>7%</td>
<td>54%</td>
<td>45%</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Labor win</td>
<td>25%</td>
<td>38%</td>
<td>13%</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Management win</td>
<td>67%</td>
<td>40%</td>
<td>20%</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>US strikes authorized by a union (57 strikes had recorded results)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compromise</td>
<td>5%</td>
<td>68%</td>
<td>99%</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>Labor win</td>
<td>32%</td>
<td>54%</td>
<td>51%</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td>Management win</td>
<td>63%</td>
<td>55%</td>
<td>53%</td>
<td>32</td>
<td>14</td>
</tr>
<tr>
<td>Massachusetts (190 strikes had recorded results)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compromise</td>
<td>6%</td>
<td>28%</td>
<td>12%</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Labor win</td>
<td>32%</td>
<td>29%</td>
<td>10%</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Management win</td>
<td>62%</td>
<td>36%</td>
<td>13%</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>Massachusetts strikes authorized by a union (29 strikes had recorded results)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compromise</td>
<td>7%</td>
<td>52%</td>
<td>52%</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Labor win</td>
<td>45%</td>
<td>36%</td>
<td>11%</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>Management win</td>
<td>48%</td>
<td>58%</td>
<td>53%</td>
<td>33</td>
<td>14</td>
</tr>
<tr>
<td>Bombay City (430 strikes had recorded results)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compromise</td>
<td>13%</td>
<td>62%</td>
<td>73%</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>Labor win</td>
<td>16%</td>
<td>76%</td>
<td>94%</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Management win</td>
<td>71%</td>
<td>44%</td>
<td>24%</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Ahmedabad (410 strikes had recorded results)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compromise</td>
<td>13%</td>
<td>38%</td>
<td>26%</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Labor win</td>
<td>20%</td>
<td>42%</td>
<td>28%</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Management win</td>
<td>67%</td>
<td>31%</td>
<td>25%</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Upcountry (150 strikes had recorded results)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compromise</td>
<td>19%</td>
<td>68%</td>
<td>78%</td>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>Labor win</td>
<td>15%</td>
<td>61%</td>
<td>74%</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Management win</td>
<td>67%</td>
<td>56%</td>
<td>58%</td>
<td>18</td>
<td>9</td>
</tr>
</tbody>
</table>
Table 3.
Probit Regression Estimating Probability Strike would not result in a "Management Win"

<table>
<thead>
<tr>
<th></th>
<th>Bombay City Strikes.</th>
<th>Ahmedabad Strikes.</th>
<th>Upcountry Strikes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>obs. 434</td>
<td>obs. 404</td>
<td>obs. 149</td>
</tr>
<tr>
<td>strike participation</td>
<td>coefficient 0.676*</td>
<td>coefficient 0.505*</td>
<td>coefficient 0.475</td>
</tr>
<tr>
<td></td>
<td>standard error 0.184</td>
<td>standard error 0.254</td>
<td>standard error 0.343</td>
</tr>
<tr>
<td>strike length</td>
<td>-0.0001</td>
<td>0.005</td>
<td>-0.002</td>
</tr>
<tr>
<td></td>
<td>standard error 0.003</td>
<td>standard error 0.007</td>
<td>standard error 0.006</td>
</tr>
<tr>
<td></td>
<td>Pr&gt;Chi 0.0002</td>
<td>Pr&gt;Chi 0.047</td>
<td>Pr&gt;Chi 0.167</td>
</tr>
<tr>
<td></td>
<td>Square 0.972</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * indicates significant at the 5% level. The last column is probability associated with a Wald test that an individual coefficient is zero.
Table 4. Descriptive Statistics of the Annual Series Of Days Lost To Strikes Per Worker For the Bombay Presidency, England and the United States.

<table>
<thead>
<tr>
<th>year</th>
<th>GB days lost/worker</th>
<th>US days lost/worker*</th>
<th>Bombay Presidency days lost/worker</th>
<th>Bombay City days lost/worker</th>
<th>Upcountry Bombay days lost/worker</th>
<th>GB strikers/workers</th>
<th>US strikers/workers</th>
<th>Bombay Presidency strikers/workers</th>
<th>Bombay City strikers/workers</th>
<th>Upcountry Bombay strikers/workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1921-38</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>average</td>
<td>1.77</td>
<td>2.36</td>
<td>24.15</td>
<td>39.16</td>
<td>6.11</td>
<td>0.09</td>
<td>0.10</td>
<td>0.36</td>
<td>0.59</td>
<td>0.23</td>
</tr>
<tr>
<td>median</td>
<td>0.17</td>
<td>1.05</td>
<td>4.83</td>
<td>3.32</td>
<td>3.26</td>
<td>0.02</td>
<td>0.04</td>
<td>0.33</td>
<td>0.31</td>
<td>0.17</td>
</tr>
<tr>
<td>max</td>
<td>7.38</td>
<td>9.25</td>
<td>132.68</td>
<td>225.10</td>
<td>34.29</td>
<td>0.40</td>
<td>0.73</td>
<td>1.30</td>
<td>2.13</td>
<td>0.61</td>
</tr>
<tr>
<td>min</td>
<td>0.03</td>
<td>0.29</td>
<td>0.55</td>
<td>0.63</td>
<td>0.27</td>
<td>0.00</td>
<td>0.01</td>
<td>0.06</td>
<td>0.04</td>
<td>0.06</td>
</tr>
<tr>
<td>Late 19th century</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>average</td>
<td>1.61</td>
<td>1.64</td>
<td></td>
<td></td>
<td></td>
<td>0.03</td>
<td>0.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>median</td>
<td>0.68</td>
<td>0.55</td>
<td></td>
<td></td>
<td></td>
<td>0.03</td>
<td>0.03</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>max</td>
<td>7.09</td>
<td>9.80</td>
<td></td>
<td></td>
<td></td>
<td>0.06</td>
<td>0.26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>min</td>
<td>0.26</td>
<td>0.09</td>
<td></td>
<td></td>
<td></td>
<td>0.02</td>
<td>0.01</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: The US series is approximated by Massachusetts for the late 19th century. While the days lost per worker series in figure 3 is all textile workers for Britain, the strikers per worker measure here is only for cotton textiles for the late 19th century.

Sources: See text.
### Table 5.
Annual Days lost to Strikes per worker in the UK, 10 year averages

<table>
<thead>
<tr>
<th></th>
<th>Building &amp; Construction</th>
<th>Mining and Quarrying</th>
<th>Metal Manufacture</th>
<th>Textiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1891-1900</td>
<td>0.76</td>
<td>6.65</td>
<td>1.24</td>
<td>1.16</td>
</tr>
<tr>
<td>1901-1910</td>
<td>0.15</td>
<td>1.73</td>
<td>0.61</td>
<td>0.60</td>
</tr>
<tr>
<td>1911-1920</td>
<td>0.56</td>
<td>5.77</td>
<td>1.30</td>
<td>1.67</td>
</tr>
<tr>
<td>1921-1930</td>
<td>0.51</td>
<td>19.27</td>
<td>1.37</td>
<td>2.16</td>
</tr>
<tr>
<td>1931-1938</td>
<td>0.07</td>
<td>1.05</td>
<td>0.10</td>
<td>1.31</td>
</tr>
</tbody>
</table>

Note: Annual employment was interpolated across census years.

Sources: Labor Force data were from table Labour Force 1, and Days Lost data were from table Labour Force 9, both from Mitchell, *Abstract of British Historical Statistics*.

### Table 6.

#### Ratio of Male Textile Daily Wages in Cities of Bombay Presidency to Daily Wage of Deccan Field Labor

<table>
<thead>
<tr>
<th></th>
<th>1926</th>
<th>1933</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bombay</td>
<td>2.30</td>
<td>2.75</td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>2.30</td>
<td>2.75</td>
</tr>
<tr>
<td>Sholapur</td>
<td>1.45</td>
<td>1.92</td>
</tr>
</tbody>
</table>

#### Ratios of Daily Wages in Textiles in the US to Unskilled Occupations in 1890

<table>
<thead>
<tr>
<th></th>
<th>1.09</th>
<th>0.74</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>female</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Ratios of Daily Wages in Textiles in England to Unskilled Occupations in 1890s

<table>
<thead>
<tr>
<th></th>
<th>1.30</th>
<th>0.96</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>female</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>