Cornell University
ILR School

ILRReview

Volume 61 | Number 4 Article 2

July 2008

Strikes in Colonial India, 1921-1938

Susan Wolcott
Binghamton University

Follow this and additional works at: http://digitalcommons.ilr.cornell.edu/ilrreview

Strikes in Colonial India, 1921-1938

Abstract
Newly collected data on India's textile industry over the years 1921–38 show strike rates far higher than those observed in the British or U.S. textile industries when they were 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. The author believes that these data may point to the important role of social norms of cooperation in sustaining collective action.

Keywords
strikes, colonial India

This article is available in ILRReview: http://digitalcommons.ilr.cornell.edu/ilrreview/vol61/iss4/2

STRIKES IN COLONIAL INDIA, 1921–1938

SUSAN WOLCOTT*

Newly collected data on India's textile industry over the years 1921–38 show strike rates far higher than those observed in the British or U.S. textile industries when they were 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. The author believes that these data may point to the important role of social norms of cooperation in sustaining collective action.

There are many historical studies of strike behavior in the industrialization of the now rich countries, but almost no quantitative studies of strikes in the initial industrial development of poor countries. In this paper, I examine a rich and relatively underused data source on Indian cotton textile strikes occurring in 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 United States and Britain. I find that strike frequencies in India were 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.

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 author is Associate Professor of Economics, Binghamton University. She thanks John Conlon, Price Fishback, Joyce Jacobsen, Stanley Masters, and participants at seminars at the University of Mississippi, Northwestern University, Binghamton University, and Rhodes College, as well as at the 1999 Economic History Association Meetings in Baltimore, for their comments.

A data appendix with additional results, and copies of the computer programs used to generate the results presented in the paper, are available from the author at P.O. Box 6000, Binghamton, NY13902–6000; swolcott@binghamton.edu.

[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).

Industrial and Labor Relations Review, Vol. 61, No. 4 (July 2008). © by Cornell University.
0019-7939/00/6104 $01.00

the Presidency. Altogether, the cotton textile mills in the Bombay Presidency accounted for three-quarters of cotton textile employment in the Indian subcontinent 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 studying 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 strike's outcome. The way the outcome was reported varies over the years, with more details being given in the early editions. For example, in the first edition, August 1921, the outcomes 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.)

The descriptions are even more terse in later issues. They note only that the strike "ended in favor of the employers" or "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, total number of days lost to strikes, and 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 work force affected by the strike, I combine the *Gazette* data with data in the Bombay Millowners' Association *Annual Report.* This source lists the name, location, 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. Aggregated textile strike data are available for the United States and Britain for the period of observation (the 1920s and 1930s), and with these data I can make some cross-country comparisons, such as for annual number of days lost to strikes per worker. But the most similar and comparable data sets were actually collected in the United States and Britain in the 1880s and 1890s (see data appendix). An important advantage of the disaggregated nineteenth-century U.S. and British data is that they allow me to construct measures of strike success and mill participation, as I did for India. As I argue in a subsequent section, these two aspects of strikes may be especially important in understanding relative strike frequencies across the countries.

Fortunately, the 1880s and 1890s in the United States and England are a particularly suitable period for my comparison—better suited than the interwar period would be if data were available. There are two reasons for this. First, as some studies show that strike frequencies in a given industry 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 United States was unstable, affected by the Great Depression and other factors. The rate of employment growth in England and the United States in the 1880s and 1890s, in contrast, was similar to rates in Indian regions outside of Bombay City in the 1920s and 1930s. Second, the legal and institutional environment of the late nineteenth century

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

Region	*Years*	*Mills*	*Workers*	*Strikers/ Year/Mill*	*Strikes/ Year/ Laborer*	*Strike Days/ Year/Laborer*	*Avg. Days*	*Median Days*	*Avg. Participation*	*Median Participation*	*% Success*
Presidency	1921–1938	197	244,875	0.28	0.41	22.96	9.9	5	46%	30%	32%
Bombay	1921–1938	73	130,308	0.33	0.59	38.06	11.4	6	52%	40%	30%
Ahmedabad	1921–1938	68	64,235	0.34	0.25	5.16	5.9	3	34%	26%	34%
Elsewhere (upcountry)	1921–1938	56	50,332	0.15	0.17	6.60	16.8	8	59%	71%	33%
England	1889–1900	2,538	528,795	0.03	0.04	0.82	21.3	5	98%	100%	66%
England	1921–1938		1,084,567		0.09	1.77					
United States	1881–1894	830.5	198,122	0.03	0.04	1.39	17.1	7	41%	20%	33%
Massachusetts	1881–1894	181	69,029	0.07	0.06	1.70	13.8	5	33%	10%	38%
United States	1927–1938		396,995		0.10	2.36					

Notes: Strike participation is the percentage of the mill's labor force joining the strike. % success is the percentage of strikes ending in either a labor victory or a compromise.

Sources: See text.

in the United States and England was more comparable to that of interwar India. I will return to this point later.

Strike Rates

Table 1 compares descriptive measures of the Presidency strikes (1921–38) to similar measures for England and the United States as a whole (separate figures for the late nineteenth century and the 1920s–1930s), as well as for Massachusetts alone (the late nineteenth century). I separate out Massachusetts because there is evidence that the early U.S. data are somewhat incomplete, and tend to be more incomplete the more remote the area and the smaller the strike (Bailey 1991). Data for the compact Massachusetts industry 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 nineteenth-century cotton textile workers in England struck 0.8 days per year, and those in the United States 1.4 days per year. Even in the turbulent interwar period, the days lost to strikes per year per worker in cotton textiles rose only to 1.8 in England and to 2.36 in the United States, compared to 23 in the Bombay Presidency. 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 United States or England. Similarly, each year 28% of all mills in the Bombay Presidency and 15% of mills in the upcountry experienced a strike, compared to about 3% of firms in nineteenth-century England and America and 7% of firms in Massachusetts alone. About 4% of workers were typically involved in a strike each year in the nineteenth century in the United States and England. Massive interwar restructuring of industries raised that number in the two countries to 10% and 9%, respectively. In the Presidency, the corresponding figure was 41%; it was 17%, on average, in the economically healthy upcountry firms.

The disaggregated strike data across the three countries are useful for isolating the defining features—the "nature"—of Indian interwar strikes. The table shows that the average strike in the United States in the nineteenth century did not differ greatly from strikes in any of the regions of the Presidency in the years 1921–38. Average and median lengths were similar. Success rates were similar. On the other hand, both U.S. and Presidency strikes were a bit shorter and much less successful on average than those staged in England.

But Indian strike participation was very different from that in the United States. The typical Indian mill in 1921–38 was about five times the size of the typical mill in the United States or England in the late nineteenth century. One would expect the large mill size to have decreased 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% participation. The fairly strong unions of Massachusetts, however, achieved a median of only 10%. The Presidency overall achieved a median of 30%, and there was a very surprising 71% median in the upcountry. The isolated upcountry mills were the least likely to have formally organized labor unions; workers there had fewer job opportunities, outside of agriculture, than did workers in any other regions, 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 strike length for the set of disaggregated strikes broken down by strike outcome. These outcome categories were determined subjectively by bureaucrats in their respective countries. However, Card and Olson (1995:33), examining a subset of the 1881–86 U.S. strikes from the Labor Commissioner's *Reports,* which is also my source for U.S. data, found that wage strikes classified by contemporaneous bureaucrats 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 United States the fraction of a firm's labor force involved in a strike had a strong positive effect on workers' ability to

Table 2. Strike Participation and Duration by Result.

		Participation		*Length (Days)*	
Description	*Percent of Strikes*	*Mean*	*Median*	*Median*	*Mean*
England (868 strikes[a])					
Compromise	28%	98%	100%	19	5
Labor Win	36%	98%	100%	16	5
Management Win	36%	98%	100%	27	7
U.S. (366)					
Compromise	7%	54%	45%	14	9
Labor Win	25%	38%	13%	12	4
Management Win	67%	40%	20%	19	7
U.S., Authorized by a Union (57)					
Compromise	5%	68%	99%	30	9
Labor Win	32%	54%	51%	32	24
Management Win	63%	55%	53%	32	14
Massachusetts (190)					
Compromise	6%	28%	12%	7	3
Labor Win	32%	29%	10%	11	4
Management Win	62%	36%	13%	16	6
Massachusetts, Authorized by a Union (29)					
Compromise	7%	52%	52%	6	6
Labor Win	45%	36%	11%	28	26
Management Win	48%	58%	53%	33	14
Bombay City (430)					
Compromise	13%	62%	73%	17	6
Labor Win	16%	76%	94%	8	5
Management Win	71%	44%	24%	11	6
Ahmedabad (410)					
Compromise	13%	38%	26%	6	3
Labor Win	20%	42%	28%	7	3
Management Win	67%	31%	25%	5	3
Upcountry (150)					
Compromise	19%	68%	78%	18	8
Labor Win	15%	61%	74%	12	8
Management Win	67%	56%	58%	18	9

[a]Strikes with recorded results.

get what they demanded. 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. In England, the rate of strike participation was nearly 100% regardless of outcome. In the U.S. textile strikes, "compromise" results were associated with higher average and median participation rates, though "labor wins" were not. No pattern is apparent for Massachusetts. But when we consider union-authorized strikes as a proportion of all strikes, an interesting pattern emerges in the United States and Massachusetts. Sixteen percent of U.S. strikes overall, and 15% of Massachusetts strikes, were union-authorized. These strikes come much closer to Indian participation rates. And in Massachusetts, union-authorized strikes approached 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 increased the probability that management would not win, and strike duration had very little effect on the result. The estimated coefficients for strike participation are statistically and qualitatively significant for both Bombay and Ahmedabad. The estimated probit coefficients suggest that in Ahmedabad, as participation moved from 41% to 80%, the probability that management would not win moved from 15% to 20%. In Bombay the result is slightly stronger: as participation moved from 35% to 89%, the probability that management would not win moved from 15% to 25%. The estimated coefficient is smaller and not significant at conventional 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 nineteenth-century England, nineteenth-century Massachusetts, and the interwar Bombay Presidency. I have also included Kiefer's estimate for modern U.S. strike data for comparative purposes. Kiefer's data pertain to all U.S. manufacturing industries for the period 1968–76 and cover government-recognized 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

Table 3. Probit Regression Estimating the Probability That a Strike Would Not Result in a "Management Win."

Measure	*Coefficient*	*Standard Error*	*Pr > Chi Square*
Bombay City Strikes (430 obs.)			
Strike Participation	0.676*	(0.184)	0.0002
Strike Length	–0.0001	(0.003)	0.972
Ahmedabad Strikes (404 Obs.)			
Strike Participation	0.505*	(0.254)	0.047
Strike Length	0.005	(0.007)	0.451
Upcountry Strikes (149 Obs.)			
Strike Participation	0.475	(0.343)	0.167
Strike Length	–0.002	(0.006)	0.743

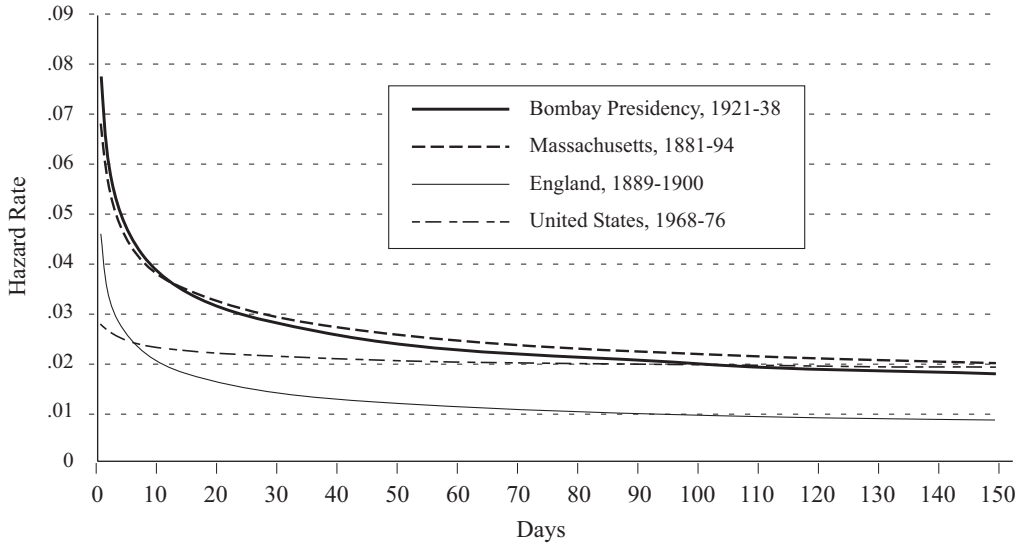
Note: The last column is the probability associated with a Wald test that an individual coefficient is zero.
*Statistically significant at the .05 level.

$$\lambda(t) = \gamma\alpha t^{\alpha-1}, \tag{1}$$

where λ is the hazard rate as a function of t, and α and γ are parameters. A higher γ shifts up the intercept of the hazard function, and a higher α decreases the absolute value of the slope. That is, a higher γ suggests strikes will more likely settle sooner, and a higher α (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 estimates 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 United States, $\alpha = 0.75$ (0.03), $\gamma = 0.07$ (0.01); and for the Bombay Presidency, $\alpha = 0.88$ (0.02), $\gamma = 0.11$ (0.01). Standard errors are in parentheses. Note that we cannot reject the hypothesis of no duration dependence in the modern data (α 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. Figure 1 indicates that the likelihood of a settlement in the first week was much higher for all three historical series than for large modern strikes. After two months, however, strikers in Massachusetts and the Bombay Presidency were just

Figure 1. Estimated Hazard Functions for Strike Duration: England (1889-1900), Massachusetts (1881-94), the Bombay Presidency (1921-38), and the United States (1968-76).



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 nineteenth-century Massachusetts textile workers.

Table 4 shows aggregate measures of the annual series of days lost to strikes per worker per year for the Bombay Presidency, England, and the United States. The worst years in the United States and England over the entire period exhibit 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 was 4.83. The figure for maximum days lost was 7.38 in England, 9.25 in the United States, and *133* in the Bombay Presidency.

Table 4 reports both averages (means) and medians. Averages of these measures are greatly affected by the few very large strikes. Medians are best at indicating typical strike activity. For England, the annual average of strike days per worker was close to the same in the interwar period and the late nineteenth century, whereas the median was lower in the interwar years. The interwar annual average of strikers per worker was much higher; the interwar median was again lower. For the United States, both strike days per worker and strikers per worker annual averages and medians were higher in the interwar period than in the late nineteenth century. But the differences across periods within countries are dwarfed by the differences between the Presidency and the United States and England in either period. For example, though the interwar period witnessed 40% higher days-lost-per-worker than the late nineteenth century did in the United States, the Presidency measure is 10 times the interwar U.S. measure. As both average and median measures are substantially higher in India, these data suggest that the Indian textile industry had more single-mill strikes and more severe multi-mill strikes.

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 United

Table 4. Descriptive Statistics: Annual Series of Days Lost to Strikes per Worker for the Bombay Presidency, England, and the United States.

Years	*G.B. Days Lost/Worker*	*U.S. Days Lost/Worker*	*Bombay Presidency Days Lost/Worker*	*Bombay City Days Lost/Worker*	*Upcountry Bombay Days Lost/Worker*	*G.B. Strikers/ Workers*	*U.S. Strikers/ Workers*	*Bombay Presidency Strikers/ Workers*	*Bombay City Strikers/ Workers*	*Upcountry Bombay Strikers/ Workers*
1921–38										
Average	1.77	2.36	24.15	39.16	6.11	0.09	0.10	0.36	0.59	0.23
Median	0.17	1.05	4.83	3.32	3.26	0.02	0.04	0.33	0.31	0.17
Max	7.38	9.25	132.68	225.10	34.29	0.40	0.73	1.30	2.13	0.61
Min	0.03	0.29	0.55	0.63	0.27	0.00	0.01	0.06	0.04	0.06
Late Nineteenth Century										
Average	1.61	1.64				0.03	0.06			
Median	0.68	0.55				0.03	0.03			
Max	7.09	9.80				0.06	0.26			
Min	0.26	0.09				0.02	0.01			

Note: The U.S. series is approximated by Massachusetts for the late nineteenth century.
Sources: See text.

States. 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 U.S. workers.

How can we explain this? Why strikes occur at all is not obvious. They involve great cost to the individual, and any payoff constitutes a public good for the work force of the firm. 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 for why strikes occur even if they waste resources 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. In this view, 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 work force.[2] Only three of the over 1,000 strikes are listed as having political causes, and the longest of these lasted just four days. But Tilly (1989:11) wrote that even so-called "economic" strikes, which he acknowledged 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 leaders of the Nationalist movement 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 a strike, and once it had begun, political leaders either volunteered, or were requested by the workers to represent them. Chadavarkar (1998:266–326) claimed that nationalist agitators exaggerated their role in workers' resistance. He believed workers' solidarity stemmed from workers' own growing perception of their shared economic sphere.

[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 mill owners were themselves Indian, and foreign mill owners outside of Bombay city were very rare. Furthermore, strike incidence was no higher in the Bombay City mills with foreign owners than in those with native owners. It is more difficult to evaluate the relationship between the nationality of managers and strike incidence, but one scrap of evidence is provided by Rutnagur's (1925) listing of the nationality of the managers of Bombay City mills over one year. Over the 1920s, the 28 mills Rutnagur listed as having a foreign manager did not have higher strike incidence than did the 49 mills with native managers.

One might still argue that the Nationalist movement contributed to this perception. Haimson (1989:525) argued 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 why strike incidence in interwar India was so much greater than it was in interwar Britain and the United States? The interwar period was a time of heightened political tension and rising labor consciousness in those countries as well. Freeman (1998) credited the unusually strong 1930s spurt in unionization in the United States 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 made these workers 10 times as radical as the fairly radical interwar British and U.S. workers seems less likely.

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 when there is a breakdown in bargaining between industrialists and organized labor due to asymmetric information (Kennan 1986; Kennan and Wilson 1989). A strike is viewed as a mechanism that conveys credible 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, or their degree of selfishness, or their subjective evaluation of equity. According to the asymmetric information model, 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) stressed the role of 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 is exacerbated. Further, the absence of a secure union presents an entirely new source of uncertainty. In these cases, the strike itself may be used to resolve workers' uncertain collective bargaining status.

Card and Olson (1995) first pointed to this role of strikes in their study of late-nineteenth-century U.S. strikes, and argued that a particular type of asymmetric model, war-of-attrition, is most appropriate for explaining the behavior of firms and workers as workers establish credibility in bargaining. In this model, each player has a delay cost that is known only to him; the other player only knows the distribution of his opponent's delay cost. This theoretical uncertain delay cost is equivalent to the actual uncertainty over the support workers will give to a strike when there is little or no control by an established union leadership. 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 $c_i \cdot t$. 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. 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 either demanding or protesting. 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 that predict duration dependence. In the other models, settlement rates are independent of duration (Kennan and Wilson 1989:s98).[3] At least one piece of empirical

[3]Kennan and Wilson (1989) cited Milgrom and Weber (1985:622) on this point. Milgrom and Weber showed that the hazard rate of the distribution of equilibrium

Table 5. Annual Days Lost to Strikes per Worker in the United Kingdom, 10-Year Averages.

Years	*Bldg. & Constr.*	*Mining & Quarrying*	*Metal Mftg.*	*Textiles*
1891–1900	0.76	6.65	1.24	1.16
1901–1910	0.15	1.73	0.61	0.60
1911–1920	0.56	5.77	1.30	1.67
1921–1930	0.51	19.27	1.37	2.16
1931–1938	0.07	1.05	0.10	1.31

Note: Annual employment was interpolated across census years.

Sources: Labor Force data are from the table "Labour Force 1," and Days Lost data are from the table "Labour Force 9," both in Mitchell (1962).

evidence described earlier—the finding of a statistically significant negative slope for the estimated hazard rates, which implies duration dependence—favors war-of-attrition models, in this regard.

The difference in relative delay costs between the bargaining players affects strike incidence in war-of-attrition models. Nalebuff and Riley (1985) proved 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, one would expect that even though exact delay costs are unknown to the other player, if both players know that the distribution of player 1's delay costs lies largely above that of player 2, the low probability of success for player 1 will greatly decrease the expected value of player 1's gains from a strike, and consequently strikes would seldom be worthwhile for player 1.

These models suggest that the relative frequency of the Indian, English, and U.S. strikes might be explained either by differing levels of uncertainty in the three countries, or by factors that 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 strike incidence in the United States and England. All three countries' industries operated in a very competitive international market, and thus the underlying business shocks in the 1920s and 1930s in India, England, and the United States were similar. India adjusted best to these shocks, as indicated by the less severe variations in employment. But I will explore the institutional framework and social environment of the three countries to identify factors that 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. Furthermore, this Act merely provided for the creation of a Labour Officer who would meet with workers and mill owners. He had no power beyond his power to persuade (Pryde 1945).

In sharp contrast, English unions achieved a relatively secure legal position fairly early. Unions and strikes were legalized in the Union Act of 1870, which also allowed workers to encourage 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,

quitting times is inversely related to the function mapping observed waiting times to types. As the dispute's duration lengthens, only low-delay-cost (high-prize-value) types remain, and so the hazard rate (the conditional probability of settling) falls.

and guaranteed that unions were no longer legally liable for breaches of contract, that is, 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 United States had roughly equivalent legal standing. In the United States, 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) showed, the actual protection offered by the Act was limited. The most important point of similarity between the United States and India was that management was not required to recognize or bargain with unions in either country. This changed in the United States after the creation of the National Labor Relations Board in 1934 and promulgation of the Wagner Act (which legalized the NLRB codes) in 1935.

The legal environment of late-nineteenth-century Massachusetts seems very close to that of interwar India. According to Bedford (1995), the Massachusetts political and legal community of that period was genuinely concerned with workers' position. Rayback (1966) showed that this concern was not universal among U.S. jurists of this period. But Bedford noted 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.

The countries' legal environments, as summarized above, would lead us to expect certain patterns. Notably, workers should have had the greatest incentive to strike in England after 1906 and in the United States in the 1930s, and late-nineteenth-century Massachusetts and India should have had similar strike frequencies. These are not the patterns found in the data. Despite an institutional environment that was not favorable 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 U.S. and British textile workers struck seldom. Indian workers were overwhelmingly male, and committed to lifetime employment in the industry. The U.S. and British labor force were more mixed, but were majority female. A large proportion of female workers is typically considered a deterrent to strike activity, perhaps because female workers' lack of commitment to the industry reduces the expectation of the prize to be won by organizing.[5] But though they were majority female, the textile industries of Britain and the United States were among the most militant labor forces in those countries if measured in terms of annual strike days per worker. For the United States, Edwards (1981:155) listed the days lost per worker to strikes by industry for the years 1927–40. The average days lost per year for the 21 industries listed was 1.3. The figure for textiles in these years was 1.6. Only coal, with 1.9 days lost to strikes per worker per year, significantly outstripped textiles on this measure, but even that figure is dwarfed by the Indian days lost data.

For the United Kingdom, I have constructed decadal averages of days lost to strikes from 1891 to 1938 for selected industries (Table 5). I chose these industries for comparison with

[4]This is similar to Currie and Ferrie's (2000) finding that the legal environment across U.S. states in the late nineteenth century had minimal effect on strike incidence.

[5]This lack of lifetime commitment could explain the more persistent resistance to speed-up demonstrated by Indian workers than by the largely teenage female Japanese labor force (Wolcott 1994), as well as the relative scarcity of women in nineteenth-century English union leadership positions (Turner 1962:293–94).

Table 6. Estimates of the Daily Wages Available in Textiles Relative to Competing Occupations: Bombay Presidency, 1920–1930, and Late-Nineteenth-Century New England.

	1926	*1933*
Ratio of Male Textile Daily Wages in Cities of the Bombay Presidency to Daily Wages of Deccan Field Labor, 1926 and 1933		
Bombay	2.30	2.75
Ahmedabad	2.30	2.75
Sholapur	1.45	1.92
Ratio of Daily Wages in Textiles to Daily Wages in Unskilled Occupations, United States, 1890		
Male (Ratio of Textile Worker Wage to Agricultural Laborer Wage)	1.09	
Female (Ratio of Textile Worker Wage to Unskilled Domestic Servant Wage)	0.74	
Ratio of Daily Wages in Textiles in England to Daily Wages in Unskilled Occupations, 1890s		
Male (Ratio of Textile Worker Wage to Agricultural Laborer Wage)	1.30	
Female (Ratio of Textile Worker Wage to Unskilled Domestic Servant Wage)	0.96	

Sources: India: textile wages, Bombay (1938, Tables VIII, IX, and X); agricultural wages, Mazumdar (1973). United States: textile wages, Shlakman (1969:183); male agricultural wages, Historical Statistics (2006, Table Ba4234–4243); female domestic servant wages, Salomon (1892:107). England: female domestic servant and textile wages, Barton (1919:516, 515); male agricultural wages, Hunt (1973:63); male textile wages, Wood (1910:47).

textiles because they all had overwhelmingly male labor forces, and relatively high strike activity. For most years, the strike proneness of the U.K. textile industry equaled or exceeded that of these other U.K. industries; and for most years, none of the British industries lost nearly as many days to strikes per worker as did the Indian textile industry. The exception is the U.K. 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 Henry 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 U.K. 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 determinant of workers' delay costs is the income they can earn during a strike. If that income is large relative to their forgone wage, delay costs are lower and, *ceteris paribus*, there should be more 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) wrote that agricultural wages in Lancaster, England's main textile center, were higher because of competition from textiles. One option for female strikers in the United States 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 the wage for the alternative activity in each region. In the United States and England, the wages for textile labor and for competing activities were roughly equivalent. 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.

Unionization

The labor force in England was much more unionized than that in either the United

States or India. English textile workers had achieved union membership rates of more than 50% by World War I.[6] Roughly 8% of Indian textile workers belonged to a labor union in 1924, which is comparable to U.S. union membership rates in textiles in the same period.[7] But 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).

One obvious benefit to workers of unionization is the availability of strike funds. The best-funded unions were the English. Turner (1962:122) wrote that the English unions were very mindful of the need to provide even non-unionized workers strike funds to minimize the potential for strikebreaking. In a 1903 textile strike in Lowell, Massachusetts, too, the union paid out strike benefits even to workers who had joined the union only after the strike began (DeVault 2004:50). For the most part, Indian unions had no financial resources to support striking workers or provide any other benefit to workers (Mukhtar 1935).

There was one exception to this general rule. The Girni Kamgar Union of Bombay, organized by middle-class communists, had a short-lived period of real prosperity. The union was registered on May 23, 1928, with just 174 members (Newman 1981:189). But the workers had come to trust and admire the communists during the April–October 1928 general strike, and the GKU quickly grew during the period between the end of the 1928 strike and the beginning of the April–September 1929 general strike. The average membership between October and March was 58,000, about half the Bombay work force. And GKU members actually paid their union subscriptions, so that when the 1929 strike began the union had an income of Rs. 94,374 (Newman 1981:216). But this was pitifully small relative to needs. Forgone wages during the 1929 strike were about Rs. 20 million. After the failure of the 1929 strike, the GKU disappeared.

Another role of unions is to resolve uncertainty. Leadership can credibly inform the rank and file as to the true state of business conditions, and the fact that there is a recognized union signals workers' ability to act collectively. This suggests that, *ceteris paribus,* greater unionization might actually lead to fewer strikes. This might explain why English workers struck less frequently than Indian workers, but showed tenacity when they did strike. It is interesting that England's strikes, which were largely by unionized workers, were longer, more cohesive in terms of workers' participation, and more duration-dependent than those in India or the United States.

On this point, it is noteworthy 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, about a fourth of Ahmedabad's work force, and that figure roughly doubled by 1930. More important, it commanded significant resources, much of which had actually been donated by mill owners 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 worker cohesion in the Ahmedabad strikes, the average mill work force participation rate being 34% compared to the Presidency average of 46%, may counter-intuitively indicate the strength of the union, rather than its weakness. This is because 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 mill owners, and tried to defuse hostility. The leaders opposed strikes in principle, and believed they should only be used as a very last resort (Patel 1987; Mukhtar 1935).

At least one Bombay mill manager held the

[6]The British measure is based on Turner's (1962) estimates for cotton industry employment (700,000) and union membership (400,000) in 1913 (pp. 22 and 25, respectively).

[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 U.S. data.

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 groups 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)

Stones's 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 Stones had met with the titular leaders of the Bombay unions in 1928 and 1934, he testified that "no one could deliver the goods," and these strikes could not be averted (Bombay 1938–40:3624, 3908).

To more fully understand Stones's frustration, it is useful to describe in detail one of the general strikes of Bombay. The strike of 1919 is the purest in that it was the first strike to involve over 100,000 workers and it predated any unionization. In India, as in many countries, there was severe inflation during the First World War, which was not fully offset by wage increases, and labor was restive. The strike began as a wage dispute in one mill of 2,500 workers and was organized by the jobbers of that mill. (Jobbers were Indian workers who were responsible for staffing a section of the mill.) When the manager of the mill did not treat the jobbers with respect, on the morning of January 9, 1919, the 2,500 workers marched to the other mill owned by the same family, and after a brief and peaceful demonstration, the workers of the second mill joined the strike. Such spontaneous coordination is not unusual. What is unusual, however, is what happened next. The striking workers "proceeded systematically through the textile mills of Parel and other industrial districts, persuading the workers in each case to quit work and join their ranks." Newspaper accounts described the procession as "orderly and well behaved," and estimated the number of men congregated by the evening as greater than 100,000.

The strike ended when the mill owners announced a 20% wage increase on January 21, 1919. Note that this concession had been negotiated not by a worker organization, but rather with the assistance of Commissioner of Police C. A. Vincent, who had been born in Bombay and was fluent in Marati. Leading jobbers had contacted Vincent on the first day of the strike to seek his intervention, and at a later point he met with a delegation of 300 jobbers and other leaders to more clearly understand the workers' demands. The *Kamgar Sabha*, a middle-class organization devoted to the betterment of the workers, also met with workers, but the workers attributed the victory to Vincent (Kumar 1971).

There were similar very large strikes in Britain and the United States. Britain had about a dozen textile strikes involving 100,000 workers or more (Turner 1962:28). The first was in 1878, the last in 1932, and among the others was a one-week industry-wide strike in 1919 over issues very similar to those in the Bombay strike. But the English strikes were undertaken by an almost completely organized labor force. Even in 1878 the union was strong. Beatrice and Sidney Webb wrote that after 1869 the Lancashire Cotton Operatives "began to be reckoned as an integral part of the Trade Union world" (Webb 1920:307). This was largely because the workers had by then been able to force employers to adopt standardized piecework rates, something they had been trying to achieve since the beginning of the century. In the United States, even the largest U.S. cotton textile strikes involved fewer than 20,000 workers before 1934. But the General Textile Strike of 1934 was the largest strike in U.S. history to that point, and involved well over 400,000 workers. This strike was also very different from the large Indian strikes. It was called by the United Textile Workers. Their August 14 vote to stage the strike was announced over a nation-wide broadcast, and the workers

walked out peacefully on the day appointed by the union (Lahne 1944:226). This narrative reinforces the statistics. It shows that unorganized Indian workers could initiate a very large strike in as orderly and complete a manner as the most organized examples in English and U.S. labor history. Unorganized Indian workers could not, however, independently negotiate a settlement.

But if England's extensive unionization is perhaps an explanation for the lower strike frequency in England than in India, how can we explain the relative strike frequency in the United States? In those limited cases in which the U.S. strike was sanctioned by a union, cohesion and success improved, as discussed earlier. But the great majority of U.S. workers were unorganized, and the great majority of strikes occurred without union involvement. U.S. strikes were also similar to Indian ones in their want of success, and U.S. strikers presented an even less united front than Indian strikers. If these conditions led to high strike frequencies in India, why were there so comparatively few strikes in the United States?

A Model of Cohesive Behavior

Could it be that something in the culture of Indian workers allowed them to mimic unionized behavior in the absence of Western-style unions? In 1893, 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) argued that a group may solve the free-rider problem associated with providing a public good (such as the gains from striking) by instituting 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 forgone 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).

Although Indian unions furnished little more than nominal oversight of strike committees, historians describing the Indian labor force have stressed the social networks that bound workers together (Chandavarkar 1998, 1994; Newman 1981, 1979; van Wersch 1992; 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 they win the strike. While it may be true that the strikebreaker 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 J. M. Campbell, a former manager of a large Bombay mill. In 1892 he ascribed the bond between the mill workers 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]

[8]Of equal interest for my argument is that Campbell contended that the workers were likely to form a union soon, as they were already exhibiting union-like behav-

To formalize this discussion, consider a society of n workers. The probability of employment is p. If the worker is employed, he receives wage w. Assume, for simplicity, that the wage available in other employment is zero. 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 disbursed 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 cast out of the group and does not have access to the donated income in subsequent periods of unemployment.

Suppose for simplicity that the workers live indefinitely. (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 members of the group, denoted *out,* receive a wage w if they are employed and 0 if unemployed. Their expected income in each period is

$$(2) \qquad ExpIncome_{out} = p \cdot w + (1 - p) \cdot 0 = pw.$$

The members of the group, denoted *in,* receive wage w if employed and a share of the donated income if they are unemployed. Their expected income is

$$(3) \qquad ExpIncome_{in} = p \cdot (w - s) + (1 - p) \cdot \left(\frac{p \cdot g \cdot n \cdot s}{(1 - p) \cdot g \cdot n} \right) = pw.$$

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).

It is reasonable to argue, however, that in the situation of extreme poverty and minimal savings seen in India, textile workers would be not risk-neutral, but 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 1/2 of w, that is, income is the same whether the worker is employed or unemployed.

Risk-averse individuals' 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 to an individual of a strike of duration t 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.

Social Organization in Interwar India and Late-Nineteenth-Century Massachusetts

In the model presented above, sharing is one sustainable equilibrium. Not sharing at

ior. "Individual workers allow their wages to be cut for objects which their 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."

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 social network sufficiently dense 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 entire group. The level of cooperation chosen will depend on what players expect other players to do. Greif (1994) pointed out that these beliefs, which he modeled as players' *a priori* probability distribution over potential equilibrium strategies, depend on existing norms predetermined by culture. This model can explain the higher relative strike frequencies in India than in the United States only if cooperation among workers, defined in terms of both income sharing and group punishment, was more encouraged by Indian culture than by U.S. culture.

Late-nineteenth-century New England textile workers 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, Poles, Armenians, and Syrians. DeVault described how each group lived separately within Lowell. Though they all supported the strike, before each strike action they always first met in their respective ethnic or gender groups. Regarding another strike, this one in 1898 New Bedford, DeVault makes a similar observation: "Both gender and ethnicity overlay and were intertwined with occupational, organizational, and political differences" (DeVault 2004:180). Thus, 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 strikebreakers in nineteenth-century America. Rosenbloom (1998:184) quoted 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, that group was an important source. Shlakman (1969:219) wrote that Greeks were brought in as strikebreakers in a 1906 textile strike, and DeVault (2004:122) wrote that French Canadians were strikebreakers in the Lowell textile strike of 1903.

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% 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) showed 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 have required cross-caste cooperation. The pronounced caste divisions present in Indian villages might suggest that they would be infertile ground for the formation of attitudes of general cooperation. But anthropologist Pauline Kolenda (1978) argued that in the villages of colonial India, the caste system provided "organic solidarity." Within the village, and extending beyond in economic systems that 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 that includes Bombay and from which the majority of the Bombay textile mill labor force was drawn.[9] While a

[9]Colonial Indian villages and the divisions of labor that existed there have been variously described as "moral"

full discussion of Indian village conventions is obviously outside 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 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). In a study of income smoothing in modern South Indian villages, Rosenzweig (1988) found a similar pattern. He reported that informal loans from wealthy farmers, employers, shopkeepers, and so on were an important component of average expenditure, equivalent to approximately 58% of the value of mean profits from crop production. Further, these loans, typically intravillage, were more than four 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 1989; Newman 1979; Rowe 1973) argue that Indian workers recreated village institutions, including patronage networks, in urban mill compounds.[10] Newman (1979) argued that the jobber was the main agent of patronage. Jobbers sometimes went into the village to recruit, but all that was usually necessary was for the jobber to be "known in the village." Newly arrived workers would come to him in search of work, lodging, and credit. "In practice, therefore, each mill hand 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 vertical ties of patronage" (Newman 1978:282). Newman argued 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 successfully be used as strikebreakers.[11] Mukhtar (1935:15) wrote that though mill owners 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 argued that the natural patron to associate themselves with 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 outlined 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, 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) argued that the mill neighborhoods formed cohesive, supportive communities. He also wrote 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 not only to settle disputes, but also to fine individuals violating the

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 importance, is independent of my argument. I am here only concerned with the *governance structure* that these conventions created.

[10]Chandavarkar (1994:174, fn. 15) listed others who held this view. He himself felt it was overdrawn.

[11]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 would not satisfy the labor needs of these large mills, if the city had been a unified labor market, and not segmented as Newman argued, there would have been enough unemployed workers in Bombay to break any individual mill strike.

community norms. "Communal sanctions were [clearly] impressive," Chandavarkar (1994:186–87) wrote, "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 land disputes, with personal matters that would lower the reputation of the caste (for example, irregular unions and family quarrels), and with other disputes between caste members (Majumdar 1958). Hutton (1963:89) wrote that "poaching on the 'practice' of a fellow-casteman would be a proper subject for the caste *panchyat.*" The *panchayat* had other functions, such as planning community festivals, reforming the sub-caste, or *jati,* customs, and—one that strikes me as 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 apparently coined by M. N. Srinivas, is the caste holding 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 forbid them likewise to receive it from them." This effectively expels him 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) wrote that the resulting "social control of members is unusually strong and effective."

Ranajit Guha (1983:190–91) illustrated 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 money lenders. Guha wrote that the unity of the villages stemmed from the threat of physical and cultural sanctions. The latter were threats of loss of status, and, at the extreme, social boycotting, "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 noted 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."[12]

The practices of sharing income and socially ostracizing strikebreakers are 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 United States.[13] But the *systematic* strike data show that Indian strikes do differ markedly from strikes in other countries both in 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. The evidence left by nineteenth-century Indian peasant uprisings shows us explicitly that these norms could contribute to collective resistance. It seems reasonable to conclude that they may also have facilitated strikes.

Empirical Validity of the Model

The ultimate test of the model is how well it describes the behaviors and outcomes of strik-

[12]Wade (1988) told of how these social sanctions facilitated provision of communal irrigation in rural India.

[13]For example, Lahne (1944:217) described 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 strikebreakers used their wages to support the strikers.

ing Indian workers. First, note that the model suggests that the labor force would exhibit the most cohesive firm-wide behavior in 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 large cities, not all workers at a mill would necessarily be interconnected socially. But mills in the outlying regions were drawing 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 longer in the upcountry than in Bombay City—an average of 16.8 days versus 11.4 days, respectively. Moreover, strikes brought out a larger fraction of the mill's work force in the upcountry (a median of 71%) than in Bombay City (40%).[14]

Next, the model indicates that workers' total incomes, which include 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 forgone 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 December 15, 1941, and August 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 strike from August 15 to about October 10, 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. Although it occurred some fifty years later, in many ways this strike paralleled the General Strikes of the interwar period. It may seem odd to suppose that the behavior of workers in the 1920s and 1930s could be similar to that of workers in the 1980s, but I believe it was. The workers still came from roughly the same villages. They still followed roughly the same pattern in terms of the ages at which they arrived in Bombay, the way they found jobs, their housing and support once they were 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% did not experience a "change of lifestyle" during this very protracted strike.

The model would suggest that workers would maintain expenditures during strikes by drawing on their social networks, which included money lenders, shops, relatives, and friends. The limited information we have shows that this was what happened. Richard Newman scoured newspaper and Labour Office accounts of the large Bombay general strikes. He wrote that the men's position in the general strike of 1919 was strengthened when "the money-lenders and shopkeepers were encouraged to add their support" (Newman 1981:127). The second general strike was begun in January 1920, but ended abruptly on February 2. The mill hands claimed, "The banias [money lenders] had allowed them one month's additional credit from the beginning of the strike and they had held out as long as their credit had lasted" (Newman 1981:137). In both the 1925 and the 1928 general strikes, the Labour Office estimated that between 50,000 and 60,000 of the workers, about half the strikers, returned to their home villages, even though these were hundreds of miles away. A lesser but still very large number left during the 1929 strike (Newman 1981:157, 202, 245).

We have more complete information on later strikes. Between November 1968 and February 1969, the India Labour Bureau (1969) surveyed workers from all parts of India to determine how they survived work stoppages of various sorts, including strikes. They surveyed a total of 517 workers, including 178 workers affected by strikes. The strikes lasted, on average, 42 days. Despite an income fall that averaged 37.5% during the strike (India Labour Bureau 1969, Table

[14]One might conjecture that the length and cohesiveness of upcountry strikes were due to underreporting in the outlying areas. Perhaps only the more severe strikes were being reported. This appears to be unlikely, however, as the percentage of one- and two-day strikes in India as a whole was 17, whereas in the upcountry it was 21.

5.5), the average drop in spending was only 10.5% (Table 5.8). The workers made up the difference by greatly increasing their borrowing. Their small average monthly budget surplus before the "reference period" of Rs. 1.06 became an average deficit of Rs. 62.2. (Average monthly income before the reference period was Rs. 238.) The percentage of workers who had debt was 60.9% before the reference period and 80% during the reference period (India Labour Bureau 1969, Table s-27). The average increase in debt per family was Rs. 82. Tables s-31 and s-32 indicate the sources of borrowed funds. When this information is combined with the total amounts borrowed, one can measure the change in the level of borrowing from each source. This exercise suggests that there was a fall in relative borrowing from provident funds, co-operative societies, and banks, an increase of about 9% in relative borrowing from shopkeepers, and much larger increases in borrowing from money lenders (53% higher than before) and from friends and relatives (54% higher than before). The increase in borrowing from money lenders together with friends and relatives was actually larger than the total increase in debt during the reference period. The 1983 strikers in van Wersch's study maintained their expenditure levels in similar ways: by returning to their villages, or by borrowing from their city neighbors and obtaining credit from their usual grain merchants. Another way the 1982 workers survived the strike is also interesting: they worked in cotton textile mills, but not their own mills. This was apparently not considered strikebreaking. My model would have predicted that pattern, 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 loyal only to their immediate group.

Conclusion

Indian interwar textile workers exhibited an impressive ability to act collectively in bargaining with employers. They struck ten times more frequently than other comparable workers, while maintaining a high degree of group cohesiveness as indicated by strike length and percentage of the mill work force participating in strikes. Moreover, 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 that 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 evidenced the fewest worker days lost to strikes.

What sustained strikers 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 do these historical Indian strike data suggest about the general applicability of modern strike theories? First, they reinforce the notion that credible labor leadership can play a positive role in decreasing strike incidence. Second, they suggest 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 United States and England

The U.S. data come from various sources. Data on individual strikes in U.S. mills are available in the *3rd Annual Report* and *10th Annual Report* of the Commissioner of Labor, 1888 and 1896. These data cover the years 1881–94. 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 total number of workers employed by the mill. I also collected information on total employment in cotton textiles and the number of mills from the 1890 *Industrial Census.* For the years 1927 to 1936, Florence Peterson's *Strikes in the United States*, published in a U.S. Bureau of Labor Statistics *Bulletin,* gives data on the aggregate number of strikes, the aggregate number of workers involved in strikes, and the aggregate man days lost to strikes for the U.S. cotton textile industry. I extend these series to 1938 using data from later *Bulletins.* There are, however, no data on individual strikes for the United States after 1894. Aggregate U.S. 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 Department in the Parliamentary Papers from 1889 to 1900. But only what the bureaucrats considered important strikes were 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 strike outcome, 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 information 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 to strikes per worker in Britain.

REFERENCES

Appadurai, Arjun. 1984. "How Moral is South Asia's Economy? A Review Article." *Journal of South Asian Studies,* Vol. 43, No. 3 (May), pp. 481–97.

Ashenfelter, Orley, and George E. Johnson. 1969. "Bargaining Theory, Trade Unions, and Industrial Strike Activity." *American Economic Review,* Vol. 59, No. 1 (March), pp. 35–49.

Bailey, Gary L. 1991. "The Commissioner of Labor's Strikes and Lockouts: A Cautionary Note." *Labor History,* Vol. 32, No. 3 (Summer), pp. 432–40.

Barton, Dorothea M. 1919. "The Course of Women's Wages." *Journal of the Royal Statistical Society,* Vol. 82, No. 4 (July), pp. 508–53.

Bedford, Henry F. 1995. *Their Lives and Numbers.* Ithaca, N.Y.: Cornell University Press.

Bellwinkel, Maren. 1973. "Rajasthani Contract Labour in Delhi: A Case Study of the Relationship between Company, Middleman, and Worker." *Sociological Bulletin,* Vol. 23, No. 1 (March), pp. 78–97.

Bendor, Jonathan, and Piotr Swistak. 2001. "The Evolution of Norms." *American Journal of Sociology,* Vol. 106, No. 6 (May), pp. 1493–1545.

Bombay (Presidency), Labour Office. Various years. *Labour Gazette.* Bombay: Government Printing Office.

____. Textile Labour Inquiry Committee. 1938–40. Oral Evidence (Main Enquiry), Vol. XVI. File 72-C Maharashtra State Archives, India.

____. 1938. Report of the Textile Labour Inquiry Committee, Vol. 1, Interim Report. Bombay: Government Central Press.

Bombay Millowners Association. 1920–38. *Annual Report.*

Booth, Alison L. 1995. *The Economics of the Trade Union.* Cambridge: Cambridge University Press.

Brown, Kenneth D. 1982. "Trade Unions and the Law." In Chris Wrigley, ed., *History of British Industrial Relations, 1875–1914.* Amherst, Mass.: University of Massachusetts Press.

Card, David, and Craig A. Olson. 1995. "Bargaining Power, Strike Durations, and Wage Outcomes: An Analysis of Strikes in the 1880s." *Journal of Labor Economics,* Vol. 13, No. 1 (January), pp. 32–61.

Chakrabarty, Dipesh. 1989. *Rethinking Working Class History.* Princeton: Princeton University Press.

Chandavarkar, Rajnarayan. 1994. *The Origins of Industrial Capitalism in India: Business Strategies and the Working Classes in Bombay, 1900–1940.* New Delhi: Cambridge University Press.

____. 1998. *Imperial Power and Popular Politics: Class, Resistance, and the State in India, c. 1850–1950.* Cambridge: Cambridge University Press.

Clegg, H. A. 1964–1994. *A History of British Trade Unions Since 1889,* Vol. 1, *1889–1910.* New York: Oxford University Press.

Cruikshank, Douglas, and Gregory S. Kealey. 1987. "Strikes in Canada, 1891–1950." *Labour/Le Travail,* Vol. 20 (Fall), pp. 85–146.

Currie, Janet, and Joseph Ferrie. 2000. "The Law and Labor Strife in the United States, 1881–1894." *Journal of Economic History,* Vol. 60, No. 1 (March), pp. 42–66.

DeVault, Ileen A. 2004. *United Apart: Gender and the Rise of Craft Unionism.* Ithaca, N.Y.: Cornell University

Press.
Dirks, Nicholas B. 2001. *Castes of Mind: Colonialism and the Making of Modern India.* Princeton: Princeton University Press.
Edwards, Paul K. 1981. *Strikes in the United States, 1881–1974.* New York: St. Martin's Press.
Feinstein, Charles H. 1972. *National Income, Expenditure, and Output of the United Kingdom, 1855–1965.* Cambridge: Cambridge University Press.
Freeman, Richard B. 1998. "Spurts in Union Growth: Defining Moments and Social Process." In Michael D. Bordo, Claudia Goldin, and Eugene N. White, eds., *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century.* Chicago: University of Chicago Press.
Friedman, Gerald. 1998. *State-Making and Labor Movements.* Ithaca, N.Y.: Cornell University Press.
Godard, John. 1992. "Strikes as Collective Voice: A Behavioral Analysis of Strike Activity." *Industrial and Labor Relations Review,* Vol. 46, No. 1 (October), pp. 161–75.
Gordon, Andrew. 1991. *Labor and Imperial Democracy in Prewar Japan.* Berkeley: University of California Press.
Great Britain, Central Statistical Office. Various years. *Annual Abstract of Statistics.* London: HMSO.
Great Britain, East India. 1908. *Report of the Indian Factory Labour Commission, 1908* (cmd. 4292). London: HMSO.
Great Britain, Ministry of Labour. Various Years. *Annual Report on Strikes and Lockouts.* London: HMSO.
____. 1926. *Eighteenth Abstract of Labour Statistics of the United Kingdom.* London: HMSO.
Great Britain, Royal Commission on Labour. 1893. *Foreign Reports,* Vol. 2, *The Colonies and the Indian Empire.* London: HMSO.
Greif, Avner. 1994. "Cultural Beliefs and the Organization of Society: A Historical and Theoretical Reflection on Collectivist and Individualist Societies." *Journal of Political Economy,* Vol. 102, No. 5 (October), pp. 912–50.
Guha, Ranajit. 1983. *Elementary Aspects of Peasant Insurgency in Colonial India.* Delhi. Oxford University Press.
Haimson, Leopold H. 1989. "Conclusion." In Leopold H. Haimson and Charles Tilly, eds., *Strikes, Wars, and Revolutions in an International Perspective.* Cambridge: Cambridge University Press.
Hunt, Edward H. 1973. *Regional Wage Variations in Britain, 1850–1914.* Oxford: Clarendon Press.
Hutton, John. 1963. *Caste in India.* Cambridge: Cambridge University Press.
India, Labour Bureau. 1969. *Report on Survey as to How Workers Support Themselves During Retrenchment, Lay-Off, Closure, and Strikes, and Collection of Data Regarding Indebtedness.*
India, Office of the Labour Commissioner. 1944. *Central Provinces and Berar: Report of the Enquiry into the Family Budgets of Industrial Workers at Nagpur, 1941–42.* Nagpur, Central India: Government Printing.
Kennan, John. 1986. "The Economics of Strikes." In Orley Ashenfelter and Richard Layard, eds., *Handbook of Labor Economics,* Vol. 2. Amsterdam and New York: North Holland.
Kennan, John, and Robert Wilson. 1989. "Strategic Bargaining Models and Interpretation of Strike Data." *Journal of Applied Econometrics,* Vol. 4 (December), pp. s87–s130.
Kiefer, Nicholas M. 1988. "Economic Duration Data and Hazard Functions." *Journal of Economic Literature,* Vol. 26, No. 2 (June), pp. 646–79.
Knowles, K. G. J. C. 1952. *Strikes—A Study in Industrial Conflict, with Special Reference to British Experience between 1911 and 1947.* New York: Philosophical Library.
Kolenda, Pauline. 1978. *Caste in Contemporary India: Beyond Organic Solidarity.* Menlo Park, Calif.: Benjamin/Cumming.
Kumar, Chakrapani B. 1961. *Development of Industrial Relations in India.* Bombay: Orient Longmans.
Kumar, Ravinder. 1971. "The Bombay Textile Strike, 1919." *Indian Economic and Social History Review,* Vol. 8, No. 1 (March), pp. 1–30.
Lahne, Herbert J. 1944. *The Cotton Mill Worker.* New York: Farar & Rinehart.
Majumdar, D. N. 1958. *Caste and Communication in an Indian Village.* Bombay: Asia Publishing House.
Marriott, McKim, ed. 1955. *Village India: Studies in the Little Community.* Chicago: University of Chicago Press.
Mayer, Adrian C. 1965. *Caste and Kinship in Central India: A Village and Its Region.* Berkeley and Los Angeles: University of California Press.
Mazumdar, Dipak. 1973. "Labour Supply in Early Industrialization: The Case of the Bombay Textile Industry." *Economic History Review,* Vol. 26, No. 3 (August), pp. 477–96.
McConnell, Sheena. 1990. "Cyclical Fluctuations in Strike Activity." *Industrial and Labor Relations Review,* Vol. 44, No. 1 (October), pp. 130–43.
Mehrban, N. A. 1945. "The Work of the Labour Office." In Clifford Manshardt, ed., *Some Social Services of the Government of Bombay.* Bombay: D. B. Taraporevala Sons.
Milgrom, Paul, and Robert J. Weber. 1985. "Distributional Strategies for Games with Incomplete Information." *Mathematics of Operations Research,* Vol. 10, No. 4 (November), pp. 619–32.
Mitchell, Brian. 1962. *Abstract of British Historical Statistics.* Cambridge: Cambridge University Press.
Morris, Morris D. 1965. *The Emergence of an Industrial Labor Force in India: A Study of the Bombay Cotton Mills, 1854–1947.* Berkeley: University of California Press.
Mukhtar, Ahmed. 1935. *Trade Unionism and Labour Disputes in India.* Bombay: Longmans, Green.
Munshi, Kaivan, and Mark Rosenzweig. 2006. "Traditional Institutions Meet the Modern World: Caste, Gender, and Schooling Choice in a Globalizing Economy." *American Economic Review,* Vol. 96, No. 4 (September), pp. 1225–52.
Nalebuff, Barry, and John Riley. 1985. "Asymmetric Equilibria in the War of Attrition." *Journal of Theoretical Biology,* Vol. 113, No. 3 (April), pp. 517–27.
Newman, Richard. 1979. "Social Factors in the Recruitment of the Bombay Millhands." In Kirti N. Chaudhuri and Clive J. Dewey, eds., *Economy and Society: Essays*

in Indian Economic and Social History. Delhi: Oxford University Press.

____. 1981. *Workers and Unions in Bombay, 1918–29: A Study of Organisation in the Cotton Mills.* Canberra: South Asian History Section, Australian National University.

Olson, Mancur. 1965. *The Logic of Collective Action.* Cambridge, Mass.: Harvard University Press.

Patel, Kunj M. 1963. *Rural Labour in Industrial Bombay.* Bombay: Popular Prakashan.

Patel, Sujata. 1987. *The Making of Industrial Relations: The Ahmedabad Textile Industry, 1918–1939.* Delhi: Oxford University Press.

Pelling, Henry. 1963. *A History of British Trade Unionism.* London: Macmillan.

Peterson, Florence. 1937. *Strikes in the United States, 1880–1936.* U.S. Bureau of Labor Statistics, Bulletin No. 651 (August).

Porter, Robert P., and Carroll D. Wright. 1890–. *Report on Manufacturing Industries in the United States at the Eleventh Census, 1890.* U.S. Bureau of the Census, 11th Census. Washington, D.C.: Government Printing Office.

Pryde, A. W. 1945. "The Work of the Labour Officer." In Clifford Manshardt, ed., *Some Social Services of the Government of Bombay.* Bombay: D. B. Taraporevala Sons.

Rayback, Joseph G. 1966. *A History of American Labor.* New York: Macmillan.

Rosenbloom, Joshua. 1998. "Strikebreaking and the Labor Market in the United States, 1881–1894." *Journal of Economic History,* Vol. 58, No. 1 (March), pp. 183–204.

Rosenzweig, Mark R. 1988. "Risk, Implicit Contracts, and the Family in Rural Areas of Low-Income Countries." *Economic Journal,* Vol. 98, No. 393 (December), pp. 1148–70.

Rowe, William L. 1973. "Caste, Kinship, and Association in Urban India." In Aidan Southall, ed., *Urban Anthropology: Cross-Cultural Studies of Urbanization.* New York: Oxford University Press.

Salmon, Lucy M. 1892. "A Statistical Inquiry Concerning Domestic Service." *Publications of the American Statistical Association,* Vol. 3, No. 18/19 (June/September), pp. 89–118.

Shlakman, Vera. 1969. *Economic History of a Factory Town: A Study of Chicopee, Massachusetts.* New York: Octagon.

Srinivas, M.N. 1962. *Caste in Modern India and Other Essays.* London: Asian Publishing House.

Tilly, Charles. 1989. "Theories and Realities." In Leopold H. Haimson and Charles Tilly, eds., *Strikes, Wars, and Revolutions in an International Perspective.* Cambridge: Cambridge University Press.

Tracy, Joseph S. 1986. "An Investigation into the Determinants of U.S. Strike Activity." *American Economic Review,* Vol. 76, No. 3 (June), pp. 423–36.

Turner, Herbert Arthur. 1962. *Trade Union Growth Structure and Policy: A Comparative Study of the Cotton Unions in England.* Toronto: University of Toronto Press.

U.S. Commissioner of Labor. 1888. *Third Annual Report of the Commissioner of Labor.* Washington, D.C.: Government Printing Office.

____. 1896. *Tenth Annual Report of the Commissioner of Labor.* Washington, D.C.: Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1919. *Census of Manufactures, 1914,* Vol. 2. Washington, D.C.: Government Printing Office.

U.S. Department of Commerce. 1931, 1937. *Biennial Census of Manufactures.* Washington, D.C.: Government Printing Office.

Van Wersch, H. 1992. *The Bombay Textile Strike.* Bombay: Oxford University Press.

Wade, Robert. 1988. *Village Republics: Economic Conditions for Collective Action in South India.* Cambridge: Cambridge University Press.

Webb, Sidney, and Beatrice Webb. 1920. *The History of Trade Unionism.* London: Longmans, Green.

Wolcott, Susan. 1994. "The Perils of Lifetime Employment: A Comparison of the Indian and Japanese Textile Industries." *Journal of Economic History,* Vol. 54 (June), pp. 307–24.

Wolman, Leo. 1976. *Ebb and Flow in Trade Unionism.* New York: Arno.

Wood, George Henry. 1910. "The Statistics of Wages in the United Kingdom During the 19th Century: Part XV, The Cotton Industry." *Journal of the Royal Statistical Society,* Vol. 73 No. 1 (January), pp. 39–58.