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Hope against Hope: Persistent Canadian Unions in the Interwar Years*

Michael Huberman†, Denise Young‡

Résumé / Abstract

Tout comme les analystes contemporains, certains observateurs des années 1920 et 1930 prédisaient un avenir sombre à la syndicalisation. Leurs prévisions étaient fausses. Cet article vise à vérifier si la renaissance des syndicats avant la Deuxième Guerre mondiale est associée à un changement organisationnel, soit l'arrivée du « CIO », ou le résultat d'une dynamique interne qui produit des périodes de croissance et de décroissance rapide. En utilisant une nouvelle banque de données sur les grèves au Canada entre 1920 et 1939, dans un modèle de guerre d'usure, cet article teste ces deux propositions. Nous trouvons que les travailleurs n'ont pas reculé face aux menaces des employeurs et dans certains cas ils ont remporté des conflits. Grâce à ces grèves gagnantes, le nombre de travailleurs syndiqués s'est accru même avant le CIO. On conclut que les prévisions courantes vouant les syndicats à la disparition au vingt-et-unième siècle sont prématurées.

Current forecasts paint a dismal future for unions; observers in the 1920s and 1930s also projected bleak prospects for organized labor. Analysts in the interwar years were off the mark. This paper seeks to investigate whether the revival of the labor movement before WWII was the result of institutional change, in particular the coming of the CIO, or the outcome of an internal dynamic that gave rise to rapid declines and spurts in growth. We test these two views in a war-of-attrition context, using a newly constructed data set on Canadian strikes between 1920 and 1939. Estimation is undertaken in a competing-risks framework. We find that workers did not cave in when employers sought to break their unions, and under certain conditions workers could outlast employers. The increasing proportion of worker wins in the early to mid 1930s led to the rise in union membership observed before the arrival of the CIO in Canada in 1937. We conclude that current predictions regarding the end of unions in the twenty-first century may prove to be premature.

Mots Clés : Syndicats, grèves, histoire économique canadienne

Keywords: Labor unions, strikes, Canadian economic history

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1. Introduction: the future of trade unions in historical perspective

Is there a future for trade unions in the twenty-first century? Extrapolating from the trend in union density rates observed in most OECD countries since the early 1990s (OECD, 1997), many have forecasted that because of the persistent downsizing of the public and manufacturing sectors union membership will continue to decline.[1] In examining a particular episode, the interwar years, that saw trade union growth first decline and then rise, we bring an historical perspective to the perennial question about the future of trade unions. More precisely, we examine whether trade unions were saved by institutional change, the coming of the Congress of Industrial Organizations (CIO), or whether trends in density rates were the outcome of internal or endogenous mechanisms that gave rise to alternating periods of growth and decline in membership. If the answer turns out to be the latter, then predictions regarding the end of trade unions may prove to be premature.

Although turning points in the growth of union membership in Canada and the U.S. differed, their trends followed a common pattern, falling in the 1920s and rising in the 1930s.[2] Labor historians in both countries have attributed the decline in membership to employer resistance and the subsequent rise to the organizing efforts of the CIO, the deus ex machina in the history of the labor movement. Recently, Richard Freeman (1998) has proposed an alternative hypothesis. Drawing on an older literature on waves of union growth, he developed a simple non-linear model that generates endogenous spurts and rapid declines in density rates. Freeman observed these punctuated waves in many OECD countries before and during the interwar years. Labor histories that give emphasis to local, regional or national unions - their personalities, ideologies and organizational types - may explain the timing of these waves and their magnitude, but the fundamentals of the model, Freeman concluded, are common wherever employers confront groups of workers.

In this paper, we test these two competing views using a new data set of Canadian strikes for the period 1920 to 1939. In Canada, as elsewhere, strike successes (for workers) and failures mirrored quite closely union growth and decline. Many strikes were about union recognition and successful strikes often encouraged non-organized workers at other firms and in other sectors to form unions.[3] Indeed, based on accounts of increased strike failure rates in the early 1920s, Canadian labor historians have referred to the period as the movement's Waterloo and ultimately, Armageddon (McKay and Morton, 1998, pp. 63-76). Trade unionism was revived only in the mid to late 1930s under the "magic" of the CIO (Morton, 1995, p. 142; Taylor and Dow, 1988, p. 13). But the literature also contains evidence, albeit scattered, to the contrary (Palmer, 1992). There was continuous organization well before the coming of the CIO and under certain conditions unions did resist employer attacks.

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[1] Canada's union density rate declined in every year from 1990 to 1995, after which it has remained stable at 31 percent.

[2] In the U.S. the unionization rate was 16.59 percent in 1920, falling to 10.3 percent in 1933, and then rising to 27.6 percent by 1939 (Freeman, 1998). For Canada, see Table 1.

[3] On strikes and unionization, see Friedman (1999). Note that the relation between strikes and unionization was not necessarily reciprocal. As Cronin (1989, p. 98) observed for Great Britain before 1914: "Strike movements built unions, but unions did not overall do a great deal to increase strike propensity."

We evaluate these views in the context of a war-of-attrition between workers and firms. Using a newly constructed data set on Canadian disputes, we estimate the probability of strike outcomes (success, failure or compromise) and capitulation times (for firms and workers) as functions of firm and striker characteristics. As this data set, in contrast to a similar one for the period 1901 to 1914 (Huberman and Young, 1999), often includes information on wage changes at the end of the dispute, we also examine the relation between wage settlements, duration and union growth. Our results indicate that the union movement was far from moribund in the period from the mid 1920s until the arrival of the CIO in 1937. Workers resisted, often violently, employers' use of replacement workers to break their unions. Althought they lost many long disputes in the 1920s, workers were able to prerserve their unions. The increasing proportion of wins in the early to mid 1930s set in motion the rise in union membership observed before the arrival of the CIO in Canada. We find that the union movement was well prepared to take advantage of the organizing efforts of the CIO, but that it was not entirely dependent upon it.

The paper is organized as follows. Section 2 summarizes the competing views of Canadian labor historians with regard to strikes and union growth between 1920 and 1939. Section 3 introduces the data set we have constructed to evaluate the literature, giving special attention to trends in replacement workers and rates of violence. In Section 4, we sketch a model of resource mobilization to explain the trends in replacements and workers' response. The model is set in the context of a war-of-attrition whose comparative statics derive from changes in capitulation times of the parties. Section 5 reports the results of the estimation. Section 6 examines the relation between wage settlements, success rates and union growth. In the concluding section, we situate our findings in terms of the larger debate about the future of trade unions.

2. The decline and rise of Canadian trade unionism

Table 1 gives the basic outline of changes in union density rates and strike dimensions in Canada between 1920 and 1939. A clear association is apparent between strike activity and union growth. As elsewhere after the war, militancy in Canada rose, culminating in the Winnipeg General Strike of 1919. The aftershocks of this outbreak were felt across Canada and extended into 1925, as reflected by the duration of disputes and percentage time-loss due to strikes (Heron, 1998). But union membership began to decline soon after Winnipeg, falling by a third in the six year period from 1920 to 1926. Over the same timespan the number of disputes fell by almost 80 percent. For the ten years after 1926 the union movement stalled, the duration of strikes remained short and time-loss remained low. It was only in 1937 that the union movement had regained its lost membership and that year was associated with an outbreak of strike activity.[4]

Fragmentation of the union movement and renewed employer resistance combined to reduce strike activity. National unions (organizations based in Canada) led by the Canadian Brotherhood of Railway Employees, formed the All-Canadian Congress of Labour in 1926 as an alternative to

[4] Using aggregate data, Swidinsky (1974) rejected the cyclical nature of disputes and union growth in the interwar years.

the Trade Labour Congress, an association dominated by the more conservative international unions. Quebec was the chasse gardée of the Catholic church which organized confessional unions to isolate workers from the influence of internationals and their militants. Communists founded their own group, the Workers' Unity League, in 1927. Finally, ethnic and gender divisions compounded regional and ideological segmentation.[5]

Divisions within the union movement were exacerbated by, if not due to, growing employer resistance to trade unionism. This opposition took two forms. As in the U.S. (Jacoby, 1997), the period saw the rise of employer sponsored initiatives, such as rudimentary health and unemployment insurance schemes, put in place to moderate worker demands for unionization (Grant, 1998). But other employers took more aggressive measures and resorted to replacement workers during strikes in order to break unions.[6] Rising unemployment rates during the depression simply increased the number of strikebreakers available.

Canadian labor historians point to the coming of the CIO in 1937 as the exogenous event in 1937 that turned the movement around. The spark plug was the General Motors strike in Oshawa. Before 1937 there existed at the auto plant only a "clandestine committee" of workers that according to the historian of the dispute, Irving Abella (1975, pp. 95-96), achieved nothing.[7] In early 1937, the company announced a speed-up of the assembly line. The workers responded. "One of the workers in the plant phoned the UAW office in Detroit for help." Abella continues:

> The UAW organizer sent from Detroit... outlined to the men the success of the UAW below the border, and the necessity of organizing in order to improve their situation. His speech must have been effective. All the men in the room voted to join the UAW... Within three days the union had enrolled 650 workers. Within a week, over a thousand had joined and after a month it had four thousand, making it the largest local in Canada.[8]

Some labor historians have raised issue with the view that gives prominence to the CIO in the movement's turnaround. Rouillard (1979) observed that by the late 1920s in Quebec local Catholic unions and internationals joined forces in strike activity. When employers used strike breakers, workers regrouped and retaliated, sometimes with violence. "As women workers faced scabs, hostile foremen, police and hired thugs," Palmer (1992, p. 238) wrote, "they were not reluctant to use physical force." Where other employers organized employee associations, workers often took control to remake them into unions. Recent scholarship has made much of the role of communist organizers in many of the periods' successful strikes.[9] But communists also had their setbacks, as in their failed attempt to organize the auto industry before the arrival of the CIO (Manley, 1986). But on the shop-floor, ideology was not the motivating issue. In a detailed study of the Workers' Unity League between 1929 and 1935, Manley (1994, p. 167) observed that

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[5] For accounts of this period, see Heron (1998), Logan (1948), Morton (1995) and Palmer (1992).

[6] Rosenbloom (1998) evaluated the use of strikebreakers in the U.S. for the period before WWI.

[7] A similar account is Crawley's (1997) study of the coming of the CIO in the Nova Scotian steel industry.

[8] Resistance to the CIO came as much from the government of Ontario as from the company. Because of a shortage of strike funds, the CIO settled quickly. Most observers conclude that workers obtained many of their demands.

[9] At its peak in 1933, communists had organized about 10-15 percent of union members (Taylor and Dow, 1988, p. 4).

local organizers "tended to operate as 'good trade unionists' rather than 'good bolsheviks,'" paying close attention to the wage and working-condition demands of their membership.

As for timing, Alberta miners, Ontario lumber workers and textile workers in Montreal, Toronto and Winnipeg participated in key confrontations in the late 1920s, and even into the depression years. Many disputes often occurred in strike waves (Cruikshank and Kealey, 1987). The trade union success of this period, Manley (1986) concluded, lay the groundwork for future organizing drives by the CIO. In the face of a deep depression and a fragmented union movement, therefore, organized workers managed to hold on to their past achievements, if not make some gains, even before 1937.

These studies of union resistance examine individual cases in their industrial, regional, ideological and gendered settings. In this respect, they sit well with the view of a fragmented union movement before the coming of the CIO. The remainder of this paper seeks to determine whether these exists a more general model of strike behavior in Canada that traverses geographic and other boundaries.

3. The Strikes and Lockouts File

To evaluate union performance before the coming of the CIO, we have assembled a sample of disputes from the Strike and Lockouts File of the Canadian Department of Labour. Drawing on reports by its representatives in the field, the file contains detailed information on individual disputes: duration, number of workers involved, cause and outcome, whether an international or national union led the strike, whether the dispute was violent and if replacement workers were used. Huberman and Young (1999) analyzed a data set from the same source for the period before 1914, but in contrast to the earlier period the file after 1920 often contains information on wage gains and losses at the end of the dispute.[10]

We collected evidence on 3225 disputes for the period 1920-1939. Strike results were recorded as success (for workers), failure or compromise, but for 543 of these disputes, 17 percent of our initial sample, no result was given. There were an additional 375 disputes (11.6 percent) which were not included owing to missing information about key elements of the dispute, such as length. Thus, for purposes of estimation we have 2307 strikes that give detail on both duration and outcome. Since information on unionization is not available for all of the observations in the sample, two other subsamples will be considered. A medium-sized sample (N=2104) which indicates whether a union was involved and a smaller sample (N=1755) which contains detail on whether or not an international union was implicated in the dispute.[11] The descriptive statistics of

[10] The file includes disputes of less than one day and with small numbers (less than six workers) of strikers. A full description of the file is found in Cruikshank and Kealey (1987). The file is by no means complete and Cruikshank and Kealey have added to it. That said, the correlation between the number of disputes they report and that from the sample used in this paper is 0.89

[11] There are differences between the samples. At the 10 percent level of significance, tests indicate that western strikes and disputes in the building trades may be underrepresented in the small compared to the large sample; mining strikes are overrepresented in the small sample at the 5 percent level. Union presence (no affiliation) is

the three samples are found in Table 2 which also provides a comparison with the period before 1914. Appendix 1 gives further definitions of variables and information on industries involved.

A comparison between a sample of strikes before 1914 and those after indicate that the average size of disputes was larger in the interwar years. The later period also saw a higher proportion of strikes involving women, and more disputes in the Maritimes and in the apparel, mining, wood and manufacturing industries. The percentage of (single-issue) strikes about wages was about the same in the two periods, and the proportion of (single-issue) disputes about union recognition or survival was lower. Still, union issues were at stake in about 17 percent of single and multiple issue disputes.[12] Disputes with miscellaneous causes were more important after 1920. Many of these strikes represented conflicts over replacement workers. In all, about 12 percent of disputes after 1920 involved replacement workers.[13] Nationals and internationals do not appear to have become relatively more or less radical; the proportion of disputes led by them was about the same in the two periods. As for outcomes, the evidence is mixed whether the period saw a decline in militancy owing to union fragmentation and employer resistance. The period after the war saw a higher proportion of wins, but the percentage of losses were also higher after 1920, owing to fewer disputes that led to compromises. Successful strikes declined with duration. The average daily setttlement rate was 5.68 percent per day in the first three days; but only 0.97 percent per day for strikes lasting between 15 to 21 days. Overall, the dispute outcomes indicate that under certain conditions strike activity was successful.

Further comparisons between the two periods can be drawn from Table 3 which reports the duration and outcome of disputes by strike issue, industry and region. The average (median) duration of disputes, 20.76 (6) days was a bit less than the early period (22.79; 8). Strikes led by internationals were slightly longer than disputes led by nationals; the opposite held before 1914. Perhaps the most important change after 1914 was that wage issue strikes lasted one week shorter than in the early period, while strikes about union recognition were eight days longer. Consistent with this trend, disputes about replacement workers lasted twice as long (41; 13) than the average dispute. Firms may have been bent on getting rid of unions, but workers were not easily deterred.

Table 4 which presents the trends of key variables gives further evidence of the exceptional nature of the period. In asymmetric strike information models workers strike to get more information about the profitability of firms. The number of disputes is expected to rise in good years, but their duration should decline because of the costs incurred by employers to delay settlement. This pattern held for the period before 1914, but is much weaker for the period after the war. There was a sharp recession in 1920-21 and another in 1924, but the number of disputes remained at low levels even in the good years of the 1920s. These findings mesh with the view of a fragmented union movement. Again contrary to the basic asymmetric strike model, the number

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underrepresented in the small sample, at the one percent level, which is to be expected since only a subset of the strikes with union presence are discarded when going from the medium to small sample.

[12] Union issues strikes constituted 29.25 percent of single and 74.32 percent of multiple issue disputes between 1901 and 1914.

[13] There is no comparable figure for the period before 1914.

of disputes actually started to rise in the depression years of 1932 and 1933. It is only in 1937 that a peak in the number of disputes is associated with strong economic growth. The evidence on durations is equally mixed. Average durations fall steadily throughout the period. Wage gains (losses in parentheses) seem to follow their own pattern. In the 1920s they averaged 14.2 (10.7) percent the 1930s, and 20.6 (8.8) percent in the 1920s.[14] Workers' wins were achieved well before the coming of the CIO. Indeed the peak years for workers' wins, for all unions and internationals only, in the 1930s were between 1933 and 1936.[15]

The persistent behavior of unions is found in Figure 1 for which we calculate the hazards, that is the sample estimates of the sequence of conditional settlement probabilities for all disputes and those led by unions only.[16] For both types of disputes, rates of settlement decline, but the probability of settlement in the first couple of days, was lower for union led, about 0.15, than for all disputes, 0.20. There are two possible interpretations of this result. First, in the early stages of disputes workers would not give up their past achievements easily; second, it is also plausible that firms tried to delay any settlements with unions. At the very least, there appears to be a different bargaining dynamic once unions are present.

How did workers and unions manage do hang on despite strong employer resistance and a deep recession? To appreciate how workers responded consider the trends in replacement workers and violent strikes found in Table 4. The uses of replacement workers was much more commonplace between 1921 and 1927, but as the number of disputes with strikebreakers fell, those involving violence rose.[17] Violence was much more frequent in the 1930s, reaching its peak in 1935.[18] To some extent, violent disputes erupted where workers were pushed to the edge, a final recourse, and were complementary with other conflicts in which workers eschewed violence. In this sense, violent disputes can be taken as one measure of worker resolve. As for the lag between rising replacements and violence, this is exactly what we would expect to see since workers needed time to build their organizations. Indeed, we posit below a simple model based on the observation that it was workers' growing frustration with employers' tactics that laid the foundation for the CIO's later success.

[14] Out of the 526 disputes, for which we can caclulate the percentage change in wages, 126 strikes were over wage decreases; 428 were over increases. Comparing wage gains across decades, mean differences are statistically different at the 5 percent level. There was no difference in wage losses.

[15] Comparing success rates across decades, mean differences are statistically significant at the 5 percent level (but not at one percent). Losses are not significantly different between decades.

[16] The methodology follows Kennan (1985), Harrison and Stewart (1989) and Huberman and Young (1999). The conditional settlement probabilities for international unions and all union led disputes were similar.

[17] Cramton, Gunderson and Tracy (1999) found that strike violence in Canada after 1945 tended to escalate when replacement workers were used. See also Cramton and Tracy (1995).

[18] For the large sample (N = 2307) only 7.95 percent of strikes with replacement workers had violent episodes. The corresponding correlation coefficient is 0.12.

4. War of attrition: model and specification

The samples from the Strikes and Lockouts File indicate the importance in the period of strikes with replacements and workers' often violent response. Figure 2 models this relationship. MR represents management's resources and WR, workers' resources, with respect to the percentage of disputes involving replacements. The nonlinearity arises because the resources the two parties bring to disputes and the incentives they have to use their resources depend critically on the percentage of disputes with strikebreakers that are in process. As drawn, there are two stable equilibria, one at 0 strikebreakers, the other at point E.

With regard to MR, the actual shape of the curve depends on the relation between the benefits and costs associated with using replacements. In the wake of a major confrontation, such as the Winnipeg strike of 1919 (say the equilibrium at 0) management may be forced to reevaluate the potential gains from resource mobilization. Firms may perceive that the benefits of breaking unions are great and to this end set up business unions, institute welfare schemes, lock out recalcitrant workers and hire replacements. As firms expend more resources, the number of replacements rises. At this stage there is probably a bandwagon effect which incites more firms to use replacements. As the use of strikebreakers reaches a certain point, the costs of such initiatives rise because firms may have to compete with each other in offering welfare programs and because the pool of potential strikebreakers may dry up. As costs rise, the advantage from additional replacements falls and at some point MR flattens out or declines.

WR also depends on a benefit-cost calculation. When MR is low, there is no incentive for workers to expend resources on fighting strikebreakers, but as MR increases so does WR, but probably not as fast as management's expenditures as indicated by the widening gap between MR and WR. Workers will expend more resources if they feel that their unions' survival is threatened - they need to show their determination by not backing down easily and rapidly - and their frustration may be manifested in increased violence on the picket line. The costs of running individual disputes may be minimized if workers can mobilize resources in strike waves. Workers may actually lose many of these confrontations, but if their unions survive they may at least be in better position in subsequent disputes. Thus, WR will rise even as MR declines, resembling the trends in replacements and violent disputes found in Table 4.[19]

The figure can be used as a heuristic device to compare exogenous and endogenous views of union history in the interwar period. In the mid 1920s employers resolve to get rid of unions led to a rise in the proportion of disputes with strikebreakers, the movement along MR. The coming of the CIO altered workers bargaining power (represented as a vertical line) fixing the number of strikes with replacement workers at E. The alternative view suggests that there was an endogenous mechanism at work in generating union decline and growth. In the early 1920s, employers drove to break up unions and the number of disputes that used replacements rose. This led to worker losses, the widening distance between MR and WR, and a decline in union

[19] The nature of these curves is further explored in Freeman (1998). Note that the equilibrium result holds if WR is constant. The model hinges on the fact that WR intersects MR from below.

membership. In time, workers responded to employer initiatives, if only to insure their own survival, and by the early 1930s the tables had turned, WR was greater than MR and to the right of E, and the number of disputes with strikebreakers declined. This period also witnessed a growing number of strike wins and union growth.

It would be difficult to estimate the MR and WR curves directly, but we can examine related aspects of the disputes and draw inferences regarding the applicability of exogenous and endogenous models. These inferences are best seen in a war-of-attrition context (Card and Olson, 1995; Kennan and Wilson, 1989; Maynard Smith, 1974). Because of its winner take all nature, this approach is appropriate in studying the interwar period when unionization itself was a key issue.[20] The basic idea of this class of models is that the probability of a successful strike (from workers' perspective) is just the probability that workers' capitulation time exceeds that of the firm's; a failed strike implies that workers' capitulation time is less than that of firm's. In other words, duration and outcome are determined simultaneously.

We draw inferences about the relation between MR and WR, and union decline and growth, by examining changes in capitulation times and in the probability of worker success. Consider then the view that firms expended resources to break unions and that union response was weak until the arrival of the CIO. Under this scenario, the use or threat of replacement workers would have reduced firms' delay costs, and/or raised that of workers, increasing the probability of worker failures. Durations would have declined as well because with the union movement fragmented, workers' capitulation times would have fallen.[21] The coming of the CIO increased workers' bargaining power, delayed their capitulation times and raised the probability of wins.

The alternative view is that workers were not passive. Initially, when MR was greater than WR, workers would not stand much of chance against employer initiatives and strikes may have resulted in failure. But strike durations would be long, because extending disputes demonstrated worker resolve. As militancy rose, the actual balance between workers' and firms' delay times became ambiguous. Given their limited resources, organized workers could win short strikes. At other times, mobilization, going on strike when workers elsewhere were also out, gave workers additional resources to extend capitulation times and perhaps outlast management. When workers could outlast firms, to the right of E, durations would be short.

In sum, the two views of the union movement make different predictions about durations and outcome. According to the view that before the CIO worker resistance was weak, it would be expected that shorter durations would be combined with worker losses. The alternate view is that it may have been in workers' interest to engage in lengthy strikes, even those doomed to failure. As workers mustered more resources, declining durations would go in tandem with worker wins.

[20] The basic model assumes that both parties have private information about the delay costs of settling disputes. Each party continues in a dispute as long as its privately known cost of continuation is less than the expected gain (the value of the prize times the probability the other party will soon capitulate). As the dispute continues, each party's probability assessment that the other will capitulate declines; eventually one of them acquiesces to stop the rising costs of delay. This class of models thus predicts declining settlement rates, exactly what we see in Figure 1.

The empirical specification of the model considers the determination of duration, outcome and wage gain (or loss) as functions of firm and worker characteristics in their surrounding social and economic environment. In particular, we consider two equations representing possible risks or outcomes (success, failure and compromise); and one equation representing observed strike duration (the minimum of the three outcomes).[22] Finally, we examine the relation between wage settlements, duration and outcome.[23]

5. Estimation results

5.1 The determinants of strike success, failure and compromise

We have estimated a multinomial logit model to take into account the three possible outcomes (Table 5). Before considering the results, some comment on the explanatory variables is in order. It might be expected that the replacement decision may have itself been affected by the duration of the strike, but Hausman tests indicated no evidence of endogeneity.[24] Unemployment relief in the table refers to those strikes by workers employed by relief agencies. Two strike-wave variables are included, the number of strikes during the year and percentage of wins during the year, to control for the possibility that workers decision to strike was based on the mobilization and success of others. Finally, we use real per capita GNP (Urquhart, 1988), measured as deviations from trend, to capture business-cycle effects. For all variables in Table 5 the first term in square brackets is the change in the probability of success; the second term in square brackets is the change in the probability of compromise.[25]

Firm's strategy to use strikebreakers appears to have achieved its goal. In all three samples, the use of replacement workers substantially increased the probability of worker failure. But, contrary to the view that strikebreakers led to more firm wins and short strikes, it was workers who seem to have done better when strikes were shorter; longer strikes tended to result in failure, although where workers could hang on they could sometimes reach compromise results. The number of workers involved in a dispute had only a minor impact on the probability of compromise. Success for workers did not exhibit any regional differences. Quebec workers were as militant as others elsewhere. Strikes involving women were more likely to succeed or end in compromise. The

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[21] On the relation between delay costs, durations and replacement workers, see Cramton, Gunderson and Tracy (1999). The authors find that a ban on replacement workers increases durations by as much as two weeks.

[22] The model is analogous to that found in Huberman and Young (1999) which contains a full description of hazard-model estimation. Huberman and Young (1999) discuss how compromise settlements can be incorporated in a war-of-attrition context.

[23] We have also estimated a wage equation with the same dependent variables as in the outcome and duration equations. Because of space limitations, we have omitted these results which are available from the authors.

[24] The Hausman tests were robust across sample sizes. In these tests real per capita GNP, along with the other exogenous controls, were used as instruments for replacement workers.

[25] The changes in probabilities across all states must sum to zero. Thus for violence, the probability of failure is 0.033.

literature of the period provides numerous examples of female workers resisting employers' use of scabs and excessive managerial authority (Palmer, 1992).

The results give support to the view that, where organized, workers could achieve some gains well before the coming of the CIO. For all workers, success was most likely where unions were involved. The probability of success was greater in strikes with multiple causes, including union related issues. There were also mobilization effects. An individual strike was more likely to succeed in years when other strikes were successful. Some of the industry effects also point to the importance of well organized unions. Across sample sizes, strikes in transportation and the utility sector had a greater probability of success. Communists were active in organizing this sector.[26] But ideology seems to have been a secondary issue. In other sectors such as the building trades, and the food and tobacco industry, where communists had a minor presence, the probability of success of success was also greater. Even unskilled workers, the least organized group, could muster the resolve to win disputes.

As for the impact of the CIO itself, note that the time trend is not significant. Neither are the miscellaneous manufacturing sector which includes the auto industry, and the presence of an international union. Regional effects were weak which does not mesh with the view that the CIO's impact was most strongly felt in central Canada.[27] Finally, the CIO's arrival coincided with a business-cycle expansion, but there were only minor GNP effects on strike outcomes.

5.2 The determinants of strike duration

Table 6 reports estimation results for several types of duration equations. All results reported are for the small sample which contains information on both whether a union was involved and whether the union was an international or national organization.[28] The first column gives results for a linear estimation with log duration as the dependent variable. Columns 2 to 5 present results from maximum likelihood estimation of a log-logistic hazard model.[29] For each hazard estimate, the last row reports the change in the predicted duration due to (1) the change of the respective dummy variable from 0 to 1; or (2) the change of the non-dummy variable from its mean value to mean +1. The last three columns give the results for a 'competing-risks model,' where the estimates can be interpreted as the capitulation times for workers (firms) leading to a success (failure), failure (success), or compromise. The results for the first two columns in Table 6 are similar, but likelihood ratio tests indicate that we need to focus on the last three columns because

[26] Communists participated in the All-Canadian Congress of Labour in the late 1920s. Led by the Canadian Brotherhood of Railway Employees, this alliance of nationalists, radicals and conservatives had a commitment, albeit fragile, to industrial unionism. Other sectors in which communists were active, like textiles, mining and wood products did not fare as well.

[27] After the Oshawa strike, the CIO sent out organizers to auto, rubber and steel plants in Ontario (Abella, 1973).

[28] There is no difference across samples with respect to union effects.

[29] The underlying model and estimation techniques are described in detail in Huberman and Young (1999, Appendix 2). Since the data set contains completed strikes only, there was no need to adjust the estimation procedures to handle truncated observations.

the determinants of duration are different for successful, failed or compromise strikes at the 5 and 1 percent levels of significance.

The determinants of duration give us some idea of when and why unions were persistent and how this behavior varied with strike outcome. Recall that according to the view that until 1937 workers were weak in the face of employer initiatives to break their organizations, it would be expected that the use of replacements would shorten durations associated with firm wins. The alternative hypothesis is that firms' use of replacements provoked workers to respond; the duration of strikes would depend on the relative bargaining power of the parties. The results appear to be consistent with the latter view.

The use of replacement workers led to longer durations for both worker and firm wins. Workers did not capitulate easily and sometimes these longer disputes were violent. Violence itself was associated with worker failures or compromises. Where unions were involved, workers had a better chance of extending their capitulation times - or were forced to - regardless of outcome. Wage and union issue strikes that ended in failure were long; but multiple issue strikes were long, whether or not workers won. Female workers had to be ever more persistent because it took them longer to win a strike than men. When other workers were on strike, successful and compromise strikes are shorter. Apparently, firm's would capitulate more quickly when workers mobilized.

The business cycle was less of a factor in explaining strike durations than in the period before 1914. In the pre-war years, both parties were willing to settle more rapidly during wage and non-wage disputes. For the interwar years, the coefficients indicate that the duration of wage issue strikes, won or lost, had no relation to the cycle.[30] Only union issue strikes that ended up in compromise tended to be shorter in good business years. Consistent with these estimates, the depression dummy in Table 6 does not pick anything up. Our reading of these results is that because of the conflictual nature of industrial relations in the period the two parties were less sensitive to the business cycle. A resource-mobilization model, like that sketched in Figure 2, provides a better representation of the period.

6. Wage settlements, successful strikes and union growth

Based on the estimation results for outcome and duration, we can now outline how worker persistence led to an increase in unionization before the coming of the CIO. To do so, we need first to consider the relation between wage settlements and duration, and then the relation between settlements, success and union growth.

We observed previously that workers had a greater probability of winning shorter strikes, and that strikes about wages that ended in failure or compromise were long. Given their limited resources, it could not be expected that workers could always and everywhere extend their capitulation times, but the relation between wage gains and duration in Table 7 reveals there were payoffs to

[30] The statistic to measure this effect is the sum of the estimates of the GNP and relevant interaction variables in Table 6)

workers if they could delay capitulating for up to three weeks.[31] For all strikes, wage gains declined marginally in the first 21 days, for those strike ending in success peak wage gains were achieved at the end of one week, and for compromise outcomes, wage gains actually increased during the first three weeks.[32]

The relation between duration and wage settlements evolved over time. Based on our samples from the Strikes and Lockouts File, we noted that wage gains were much smaller in the 1920s than the 1930s, while strike durations were longer in the earlier period. Durations fell in the 1930s not because firms were using replacements - indeed we found the number of such disputes were declining – and not because the economy had rebounded and firms felt pressed to settle quickly; rather, more militant worker organizations, abetted by mobilization effects, made firms capitulate earlier. These wins translated into higher wage settlements, and combined they led to a revival of the union movement. Figure 3 traces the success rates from the Strike and Lockouts file and the annual rate of change in union membership.[33] Peaks in success rates in 1923, 1925 and 1929 led to increases in unionization. Perhaps more pronounced is the steady rise in success rates from 1932 to 1936 and the concomitant rise in membership rates during these years prior to the arrival of the CIO.

7. Conclusion: Towards a general model of union growth and decline

We are now in a position to sum up. Beginning in the 1920s firms initiated a policy of using replacement workers to break unions. This policy did have initial successes, but workers did not capitulate easily and rapidly. Strikes in this period were long and they often resulted in worker losses. Eventually workers became more tenacious and, given the scarce resources of individual unions, they mobilized in strike waves. By the early 1930s, even during the depression years, the tables had turned and workers could force firms to capitulate more quickly. As a result, the number of replacements declined, wage settlements and success rates increased, and unionization rates followed.

This interpretation of the decline and rise of unionization rates is not entirely dependent on personalities, ideology, or organizational types like the CIO. Although communist organizers led many of the early successes, they also had their setbacks, as in the auto industry in the late 1920s. Regional factors also played a secondary role. The literature has made much of the internal divisions in the union movement, but the response mechanism we have outlined seems to have taken root across Canada and in a variety of industries, across regional, sectoral, ideological and gender boundaries. The emphasis on fragmentation may need to be revisited. The upshot is that

[31] N = 426 disputes over wage increases.

[32] Card and Olson (1995, p. 51) found a similar results for the U.S. in the 1880s. "Whereas the probability of successful settlement declines with strike duration, the wage increase conditional on workers' winning the strike does not."

[33] The relevant correlation coefficients are: membership changes and success rates, 0.74 (p=0.001); success rates and wage settlements (gains and losses), 0.47 (p=0.04); wage settlements and membership, 0.46 (p=0.04).

workers' response may have widespread because it was a built-in mechanism that ensured the survival of their unions.

We need comparative studies of union movements in other countries and in other periods before we can generalize about the relative importance of endogenous factors in union growth. The contribution of this paper, we hope, is to show that such a possibility did and perhaps still does exist.

APPENDIX 1: VARIABLE DEFINITIONS

1. Strikers: Number of strikers.

2. Female Strikers: Dummy variable equal to one if some or all of the strikers were female.

3. Firms: Dummy variable equal to one if more than one firm is involved in the strike.

4. Strike Issues:

Multiple: Dummy variable equal to one for strikes involving two or more issues.
Wage: Dummy variable equal to one for single issue strikes over wages.
Union: Dummy variable equal to one for single issue strikes over unionization.
Working Conditions: Dummy variable equal to one for single issue strikes over working conditions.

5. Union Involvement: Dummy variable equal to one if a union was involved in the strike.

6. International Union: Dummy variable equal to one if an international union was involved in the strike.

7. Year: Annual time trend.

8. Violence: Dummy variable equal to one if there were violent episodes during the strike.

9. Lockout: Dummy variable equal to one if the dispute was initiated or accompanied by a lockout.

10. Replacement workers: Dummy variable equal to one if replacements workers were used.

11. Location:

East: Dummy variable equal to one if the strike took place in Nova Scotia, New Brunswick, Newfoundland, or Prince Edward Island.
Quebec: Dummy variable equal to one if the strike took place in Quebec.
West: Dummy variable equal to one if the strike took place in Manitoba, Saskatchewan, Alberta, or British Columbia.

12. Industry Effects: Dummy variables equal to one if the strikers worked in the particular industry grouping defined as:

Apparel and Textiles: All textile garment workers (fur, cotton and woolens), hatters, tailors, and jewelry workers.
Building Trades: Bricklayers, carpenters, engineers, marble workers, and plumbers.
Unskilled. Unskilled building laborers and general laborers.
Food and Tobacco: Includes brewery workers.
Machine: Boilermakers, machinists, and stove molders.
Metals: Blacksmiths, iron molders, metal and iron workers, and wire drawers.
Mining: Includes oil drillers.
Shoes and Other Skilled: Includes leather workers and coopers.

Transportation and Utilities: Includes street laborers, all types of railway workers.
Wood Products: Includes paper workers.
Service and Public Sector: Includes barbers, civic labor, telephone workers and musicians.
Miscellaneous Manufacturing: Includes auto workers, glass and piano makers, and printers.
Other: Includes fishermen, agriculture workers, and workers who could not be classified as construction laborers.

13. Unemployment Relief Workers: Dummy variable equal to one if strikers were hired by unemployment relief agencies.

14. Output Effects: Deviations of real per capita GNP from trend level in the year of the strike.

15. 1929-33: Dummy variable equal to one if strike occurred in these years.

16. Strike Wave: Two measures were used:

Total number of strikers from the file in the year the dispute.
Percentage of strikes in the year of the dispute which were recorded as wins.

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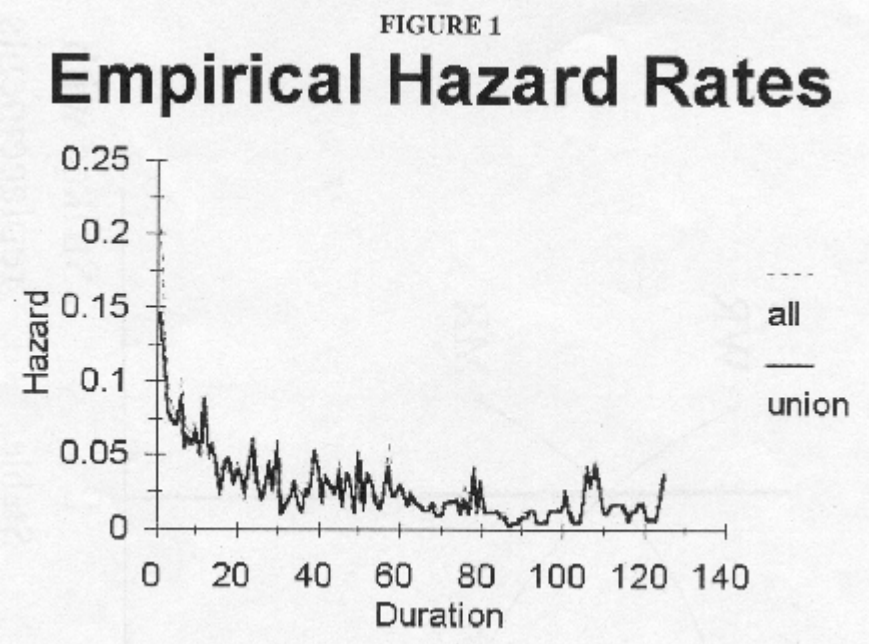
FIGURE 1



Note: The empirical hazards depicted are the sample estimates of the sequence of conditional settlement probabilities for union led and all strikes. They are calculated as the ratio of the number of strikes with duration of exactly *t* days to the number of strikes with duration of at least *t* days (with smoothing when necessary for large *t*).

FIGURE 2
Replacement Workers and Management and Worker Resources

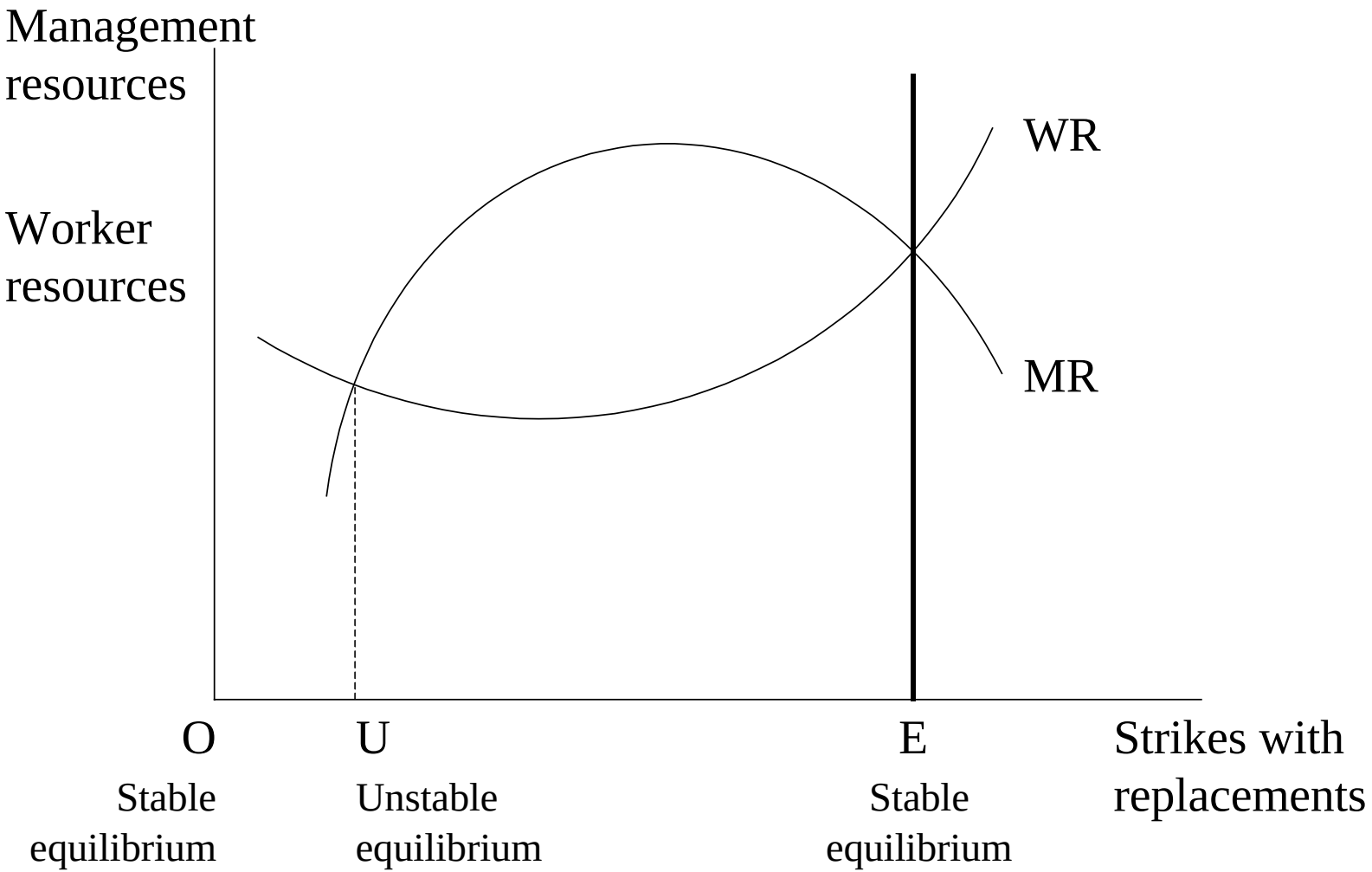


FIGURE 3
Successful Strikes and Union Membership, 1920-1939

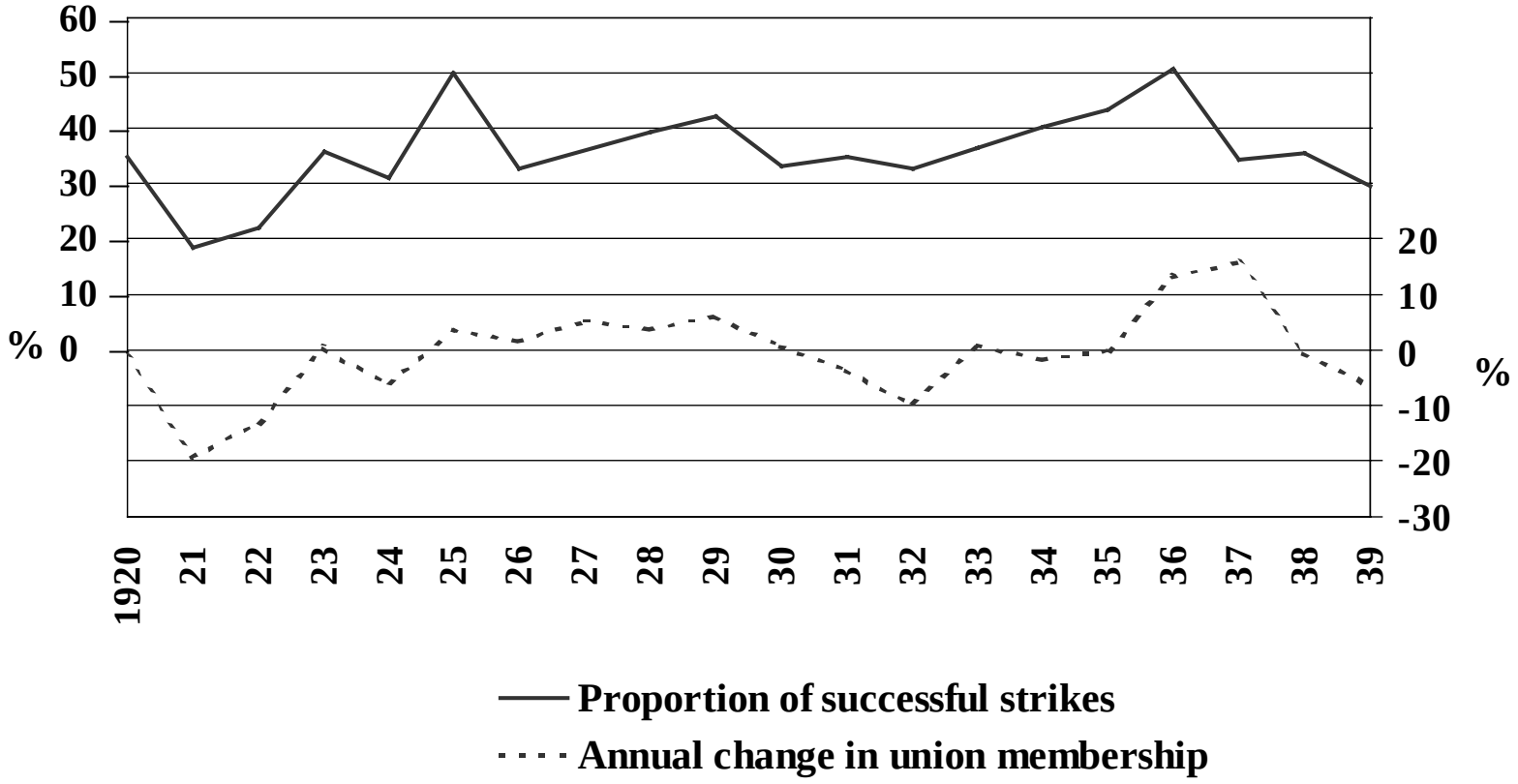


TABLE 1
Union Membership and Strikes in Canada, 1919-1939

	Total union membership ('000)	Union density rate[1] (%)	Strikes and lockouts		
			number	strike duration[2]	time loss[3] (%)
1919	378	—	336	22.84	.60
1920	374	—	322	13.25	.14
1921	313	16.0	168	37.12	.22
1922	277	13.6	104	34.92	.32
1923	278	13.2	86	19.61	.13
1924	261	13.2	70	37.75	.26
1925	271	12.3	87	41.22	.23
1926	275	12.0	77	11.19	.05
1927	290	12.1	74	6.84	.03
1928	301	12.1	98	12.75	.04
1929	320	12.6	90	11.75	.02
1930	322	13.1	67	6.67	.01
1931	311	15.3	88	19.02	.04
1932	283	15.3	116	10.90	.05
1933	286	16.7	125	11.96	.07
1934	281	14.6	191	12.54	.11
1935	281	14.5	120	8.68	.05
1936	323	16.2	156	7.96	.05
1937	384	18.2	278	12.33	.15
1938	382	18.4	147	7.29	.02
1939	359	17.3	122	5.47	.04

Source: Urquhart and Buckley (1983)
Notes: [1] Percentage of non-agricultural paid workers in unions
[2] Average days per worker involved
[3] Percent of estimated working time

TABLE 2
Means of Key Variables

	1920 to 1939			1901-1914
Variable	N = 2307	N = 2104	N = 1755	N = 532
Strikers	211.67	217.91	233.20	215.99
Female Striker	0.2432	0.2571	0.2598	0.0959
Firms	4.53	4.66	4.44	n.a. (1)
Strike Issues:				
Multiple	0.251	0.2619	0.2501	0.3327
Wage	0.4417	0.4278	0.42963	0.4361
Union	0.0472	0.0504	0.0512	0.0789
Work Conditions	0.0459	0.0475	0.0495	0.0526
Miscellaneous	0.2137	0.2124	0.2193	0.0997
Result:				
Win	0.3481	0.3541	0.3356	0.2425
Compromise	0.2579	0.2662	0.2701	0.4192
Lose	0.3940	0.3798	0.3943	0.3384
Location:				
West	0.2861	0.2761	0.2598*	0.2406
Ontario	0.4040	0.4088	0.3972	n.a. (2)
Quebec	0.1686	0.1716	0.1863	n.a. (2)
East	0.1469	0.1497	0.1618	0.0902
Union Involvement		0.7871	0.7453†††	0.7387
Union Type:				
International			0.5926	0.6109
Canadian			0.4074	0.3891
Violence	0.0351	0.034	0.0348	0.0508
Lockout	0.0256	0.0271	0.0251	n.a.
Replacements	0.1253	0.1198	0.1231	n.a.
Industry:				
Apparel	0.1725	0.1806	0.1926	0.1053
Building	0.1088	0.1117	0.0929*,†	0.0827
Unskilled	0.0390	0.0371	0.0387	0.3045
Food & tobacco	0.0446	0.0437	0.0382	0.0357
Machine	0.0095	0.0090	0.0085	0.0169
Metals	0.0368	0.0380	0.0353	0.0959
Mining	0.1695	0.1725	0.1983**,††	0.0827
Shoes	0.0390	0.0409	0.0399	0.0338
Transport	0.0858	0.0798	0.0792	0.1184
Wood	0.0867	0.0798	0.0729	0.0263
Service	0.0702	0.0703	0.0672	0.0357
Manufacturing	0.0945	0.0960	0.0929	0.0376
Unemp Relief	0.0130	0.0128	0.0154	n.a.

Notes: *Source*. Strikes and Lockouts File RG27, Department of Labour, Canada, 1901-1914, 1920-1939.
Win (Lose) indicates success (Failure) for workers.
n.a. indicates that comparable information is not available for the 1901-1914 data set.
(1) 42.29% of strikes involved 2 or more firms;
(2) 67.29% of strikes were in Ontario or Quebec.
* (†) indicates a significant difference from the corresponding mean for the N=2307 (N=2104) sample.
(*(†), significant at 10%; **(††), significant at 5%; ***(†††) significant at 1%)

TABLE 3
Number of Strikes and Mean and Durations by Category

Category	1920-1939			1901-1914	
	Number of Strikes	Duration		Duration	
		Mean	Median	Mean	Median
All	2307	20.76	6	22.79	8
Issue:					
Single Issue	1727	17.04	5	20.11	7
Multiple Issue	580	31.84	9	30.20	12
Wage (single issue)	1019	14.94	6	22.19	7
Wage (mult issue)	524	31.62	9	24.18	8
Nonwage	764	21.08	5	19.71	7
Union (single issue)	109	27.15	9	19.08	9
Union (mult issue)	276	23.63	10	31.90	12
Nonunion	1922	19.99	5.5	20.55	7
Work (single issue)	106	36.75	4.75	25.00	10
Misc (single issue)	493	14.92	4	11.72	5
Industry					
Apparel & textile	398	23.97	7	21.40	9
Building trades	251	18.26	9	26.61	11
Unskilled	90	4.62	2	14.85	7
Food & tobacco	103	13.15	4.5	37.04	12
Machine	22	56.78	13.5	58.43	9
Metals	85	28.43	9	26.61	9.5
Mining	391	12.11	4	26.16	9
Shoe & other skilled	90	20.44	9.5	20.29	8.5
Transport & utilities	198	10.19	3	10.35	4
Wood products	200	16.46	8.25	18.69	7
Services & public sector	162	18.27	6	11.44	5
Manufacturing (misc)	218	58.03	7.25	70.73	7
Other	69	9.22	4	37.41	12.5
Unemployment Relief	30	6.97	3	n.a.	n.a.
Region:					
West	660	19.04	8	21.64	10
Ontario	932	22.32	6	n.a.(1)	n.a.
Quebec	389	27.53	7	n.a.(1)	n.a.
East	339	13.02	3	20.46	7
Union Type:					
International	1040	24.93	8	33.56	12
Canadian	268	21.32	8	60.12	9

Notes: n.a. indicates that comparable information is not available for the 1901-1914 data set.
(1) The mean (median) duration for strikes in central Canada was 23.75 (7).

TABLE 4
Trends in Key Strike Dimensions

Year	Number of Strikes	Duration		Result			% of Strikes		International Union Strikes		Wages
		Mean	Median	%win	%comp	%lose	Replacement	Violent	Number	(%win)	Ave % change
1920	224	23.70	11	24.11	24.55	51.34	8.25	0.66	131	(23.66)	16.4
1921	126	85.74(1)	15	18.25	21.43	60.32	15.58	1.30	62	(19.36)	-7.7
1922	72	37.71	11	22.22	19.44	58.33	14.29	1.10	32	(37.50)	-6.1
1923	70	15.17	7.25	35.71	15.71	48.57	13.75	5.00	33	(33.33)	10.2
1924	55	16.00	8	30.91	23.64	45.45	13.64	0.00	28	(25.00)	3.4
1925	60	35.41	9	50.00	18.33	31.67	15.29	7.06	37	(54.05)	4.4
1926	61	48.21	6	32.79	19.67	47.54	20.73	4.88	21	(23.81)	10.6
1927	64	25.73	10	35.94	18.75	45.31	15.28	0.00	41	(29.27)	6.7
1928	94	18.70	7	39.36	23.40	37.23	9.43	2.83	42	(33.33)	4.6
1929	81	14.30	4	41.98	18.52	39.51	12.26	2.83	39	(38.46)	10.2
1930	76	13.03	6	32.90	19.74	47.37	10.71	0.00	36	(30.56)	0.00
1931	72	24.43	8.75	34.72	23.61	41.67	12.30	10.66	34	(41.18)	20.5
1932	125	12.96	6	32.80	17.60	49.60	13.26	5.61	41	(39.02)	-0.6
1933	127	14.02	6	36.22	28.35	35.43	4.22	9.70	34	(50.00)	-2.6
1934	208	12.51	5	40.38	25.00	34.62	6.46	8.00	49	(30.61)	17.2
1935	129	14.91	4	43.41	34.11	22.48	9.88	17.39	44	(43.18)	29.9
1936	142	11.99	4	50.70	22.54	26.76	13.19	2.75	82	(57.32)	12.8
1937	259	8.45	3.5	34.36	35.52	30.12	9.17	4.44	99	(35.35)	18.4
1938	138	13.19	3.25	35.51	38.41	26.09	8.79	1.65	70	(30.00)	24.9
1939	124	8.98	3	29.84	32.26	37.90	7.45	11.18	85	(35.29)	11.8
All	2307	20.76	6	34.81	25.79	39.40	12.53	3.51	1040	(35.00)	11.16

Notes: (1) There are nine strikes in 1921 that lasted over one year. Excluding these observations, average duration is 26.21 days.

TABLE 5
Multinominal Logit Estimation of Strike Outcomes

Variable	I: N = 1755		II: N = 2104		III: N = 2307	
	Success	Compromise	Success	Compromise	Success	Compromise
Constant	-1.03612	-0.95203	-2.48983	0.58859	0.58923	1.93560
(t-stat)	(-0.2958)	(-0.2606)	(-.7729)	(0.1738)	(0.1960)	(0.6076)
	[-0.108 , -0.067]		[-.542 , 0.347]		[-0.069 , 0.275]	
			Duration and strikers			
Length	-0.00677	-0.00015	-0.00251	-.00061	-0.00253	-0.00053
	(-2.7137)	(-0.1479)	(-1.8128)	(-0.6895)	(-1.8057)	(-0.6107)
	[-0.001 , 0.001]		[-0.000 , 0.000]		[-0.000 , 0.000]	
Strikers	-0.00003	0.00018	-.00007	0.00018	-0.00009	0.00016
	(-0.2376)	(1.7012)	(-0.5633)	(1.8361)	(-0.6985)	(1.7660)
	[-0.000 , 0.000]		[-0.000 , 0.000]		[-0.000 , 0.000]	
Female Strikers	0.41203	0.34275	0.49124	0.31474	0.46313	0.34127
	(1.9196)	(1.5269)	(2.4826)	(1.5039)	(2.4752)	(1.7050)
	[0.046 , 0.021]		[0.064 , 0.006]		[0.058 , 0.014]	
Firms	0.03250	0.02657	0.02214	0.02014	0.02404	0.02126
	(3.6355)	(3.0434)	(3.2312)	(3.0038)	(3.6364)	(3.2777)
	[0.004 , 0.002]		[0.002 , 0.001]		[0.003 , 0.001]	
			Strike Issues			
Multiple	0.55638	1.31245	0.60190	1.31545	0.59982	1.31521
	(2.6125)	(5.8475)	(3.1185)	(6.3007)	(3.2976)	(6.6077)
	[-0.018 , 0.176]		[-0.012 , 0.169]		[-0.008 , 0.168]	
Wage	0.40633	0.87100	0.29704	0.88950	0.28770	0.89365
	(2.3581)	(4.4806)	(1.8854)	(4.8974)	(1.9628)	(5.2086)
	[-0.005 , 0.113]		[-0.030 , 0.125]		[-0.029 , 0.125]	
Union	0.48115	0.43528	0.19650	0.23286	0.25677	0.24770
	(1.5001)	(1.1522)	(0.6680)	(0.6533)	(0.9078)	(0.7098)
	[0.051 , 0.030]		[0.015 , 0.021]		[0.026 , 0.018]	
Working Conditions	0.34792	0.38089	0.38800	0.60349	0.45162	0.73385
	(1.1135)	(0.9994)	(1.3258)	(1.7371)	(1.6084)	(2.2214)
	[0.030 , 0.033]		[0.016 , 0.066]		[0.018 , 0.082]	

			Union			
Union Involvement	0.28227	0.13658	0.53007	0.17693		
	(1.2497)	(0.5850)	(3.1952)	(1.0098)		
	[0.041 , -0.003]		[0.086 , -0.021]			
International Union	0.18876	0.00253				
	(0.9383)	(0.0122)				
	[0.036 , -0.017]					
			Strike Characteristics			
Year	-0.17943	-0.14735	-0.11382	-0.29874	-0.30092	-0.38057
	(-0.6810)	(-0.5315)	(-0.4690)	(-1.1610)	(-1.3220)	(-1.5667)
	[-0.020 , -0.009]		[0.007 , -0.041]		[-0.022 , -0.036]	
Year x Year	0.00371	0.00358	0.00261	0.00623	0.00566	0.00758
	(0.8528)	(0.7816)	(0.6507)	(1.4638)	(1.5033)	(1.8849)
	[0.000 , 0.000]		[-0.000 , 0.001]		[0.000 , 0.001]	
Violence	-0.69352	0.42254	-0.55585	0.29444	-0.52448	0.25338
	(-1.5286)	(1.1119)	(-1.4438)	(0.8546)	(-1.4576)	(0.7784)
	[-0.173 , 0.139]		[-0.137 , 0.106]		[-0.126 , 0.093]	
Lockout	0.08777	0.05788	0.08662	0.34174	0.12560	0.41604
	(0.1975)	(0.1277)	(0.2141)	(0.8534)	(0.3154)	(1.0686)
	[0.011 , 0.002]		[-0.017 , 0.051]		[-0.015 , 0.059]	
Replacement Workers	-4.37233	-3.06587	-4.70576	-2.96990	-4.52647	-2.83633
	(-8.3919)	(-9.6913)	(-9.0999)	(-10.478)	(-9.7742)	(-10.907)
	[-0.546 , -0.119]		[-0.622 , -0.052]		[-0.613 , -0.054]	
			Region			
West	0.00442	0.00299	0.20612	0.06064	0.19338	0.01630
	(0.0236)	(0.0154)	(1.2509)	(0.3475)	(1.2671)	(0.0999)
	[0.001 , 0.000]		[0.034 , -0.010]		[0.036 , -0.016]	
Quebec	0.02870	-0.09949	0.09374	-0.00564	0.04735	-0.02186
	(0.1478)	(-0.4843)	(0.5174)	(-0.0293)	(0.2758)	(-0.1192)
	[0.015 , -0.020]		[0.019 , -0.010]		[0.011 , -0.008]	
East	-0.55959	-0.24166	-0.33077	-0.17892	-0.27852	-0.13244
	(-2.3246)	(-0.9932)	(-1.5499)	(-0.8099)	(-1.3879)	(-0.6341)
	[-0.084 , 0.011]		[-0.047 , 0.002]		[-0.042 , 0.004]	

Industry						
Apparel and Textiles	0.31338	-0.23616	0.44107	-0.39224	0.52171	-0.45672
	(0.6455)	(-0.5211)	(0.9858)	(-0.9514)	(1.2918)	(-1.1984)
	[0.082 , -0.071]		[0.124 , -0.111]		[0.145 , -0.128]	
Building Trades	0.76273	0.85459	0.98029	0.86026	0.99277	0.76374
	(1.5382)	(1.8669)	(2.1976)	(2.1343)	(2.4897)	(2.0966)
	[0.065 , 0.076]		[0.106 , 0.053]		[0.121 , 0.036]	
Unskilled	1.10683	-0.10746	1.30832	-0.38009	1.06826	-0.67002
	(2.0748)	(-0.1919)	(2.6358)	(-0.7188)	(2.4097)	(-1.3781)
	[0.222 , -0.124]		[0.292 , -0.195]		[0.272 , -0.216]	
Food and Tobacco	0.58179	0.18674	0.81310	0.12413	0.73742	-0.08295
	(1.0453)	(0.3514)	(1.6427)	(0.2649)	(1.6572)	(-0.1932)
	[0.094 , -0.023]		[0.146 , -0.058]		[0.152 , -0.084]	
Machine	1.22446	0.42696	1.17591	0.33553	0.90906	0.22541
	(1.4914)	(0.5306)	(1.6306)	(0.4743)	(1.3742)	(0.3537)
	[0.194 , -0.042]		[0.195 , -0.058]		[0.156 , -0.048]	
Metals	0.40428	1.10503	0.51307	0.74192	0.39061	0.56144
	(0.6683)	(2.1343)	(0.9720)	(1.6209)	(0.8027)	(1.3309)
	[-0.027 , 0.154]		[0.027 , 0.078]		[0.023 , 0.059]	
Mining	0.26351	-0.17876	0.19786	-0.38348	0.29602	-0.41079
	(0.5755)	(-0.4241)	(0.4690)	(-1.0048)	(0.7810)	(-1.1745)
	[0.067 , -0.056]		[0.076 , -0.086]		[0.097 , -0.098]	
Shoes and Other Skilled	0.50788	0.68742	0.53933	0.48753	0.44480	0.23468
	(0.8929)	(1.3047)	(1.0227)	(1.0011)	(0.9282)	(0.5215)
	[0.032 , 0.071]		[0.057 , 0.031]		[0.064 , -0.002]	
Transportation and Utilities	1.05692	0.28993	1.24070	0.05044	1.12393	0.05266
	(2.1820)	(0.6379)	(2.7783)	(0.1212)	(2.8095)	(0.1396)
	[0.175 , -0.050]		[0.236 , -.113]		[0.214 , -0.098]	
Wood Products	0.07682	0.13834	0.26592	-0.05602	0.14339	-0.30584
	(0.1557)	(0.3103)	(0.5958)	(-0.1397)	(0.3594)	(-0.8358)
	[0.002 , 0.017]		[0.057 , -0.036]		[0.057 , -0.066]	
Service and Public Sector	0.50919	-0.06270	0.62653	-0.28132	0.63080	-0.34170
	(1.0127)	(-0.1314)	(1.3560)	(-0.6456)	(1.5080)	(-0.8500)
	[0.103 , -0.059]		[0.149 , -0.110]		[0.156 , -0.118]	
Miscellaneous Manufacturing	0.67026	0.51996	0.64491	0.43484	0.63127	0.27088
	(1.3639)	(1.1555)	(1.4216)	(1.0731)	(1.5484)	(0.7295)

	[0.079 , 0.027]		[0.083 , 0.012]		[0.097 , -0.014]	
Unemployment	0.20170	-1.37096	0.28367	-1.58676	-0.23080	-1.86463
Relief Workers	(0.3196)	(-1.8110)	(0.4674)	(-2.1616)	(-0.4200)	(-2.6338)
	[0.169 , -0.258]		[0.211 , -0.303]		[0.133 , - 0.297]	
			Output Effects			
GNP	0.00031	-0.00064	0.00035	-0.00051	0.00000	-0.00037
	(0.7108)	(-1.2149)	(0.8438)	(-1.0071)	(0.0044)	(-1.0042)
	[0.000 , -0.000]		[0.000 , -0.000]		[0.000 , -0.000]	
Union presence	-0.00039	0.00014	-0.00049	0.00010		
x GNP	(-1.0446)	(0.3524)	(-1.3804)	(0.2442)		
	[-0.000 , 0.000]		[-0.000 , 0.000]			
Union issue	0.00058	0.00099	0.00095	0.00140	0.00108	0.00148
x GNP	(0.7299)	(0.9887)	(1.2833)	(1.4494)	(1.5001)	(1.5540)
	[0.000 , 0.000]		[0.000 , 0.000]		[0.000 , 0.000]	
Wage issue	-0.00008	0.00056	-0.00005	0.00045	-0.00009	0.00039
x GNP	(-0.1901)	(1.1544)	(-0.1320)	(1.0086)	(-0.2571)	(0.9118)
	[-0.000 , 0.000]		[-0.000 , 0.000]		[-0.000 , 0.000]	
Work Cond	0.00079	-0.00043	0.00070	-0.00032	0.00060	-0.00027
x GNP	(1.0775)	(-0.4587)	(1.0478)	(-0.3913)	(0.9291)	(-0.3336)
	[0.000 , -0.000]		[0.000 , -0.000]		[0.000 , -0.000]	
Multiple Issue	0.00027	0.00119	0.00038	0.00112	0.00025	0.00092
x GNP	(0.5236)	(2.0932)	(0.8525)	(2.1746)	(0.5823)	(1.8661)
	[-0.000 , 0.000]		[-0.000 , 0.000]		[-0.000 , 0.000]	
1929-33 Dummy	-0.03716	-0.22143	0.02977	0.04598	0.12618	0.09258
	(-0.1550)	(-0.8464)	(0.1366)	(0.1918)	(0.6215)	(0.4109)
	[0.014 , -0.035]		[0.001 , 0.005]		[0.016 , 0.004]	
			Strike Waves			
Strike Wave	-0.00112	0.00016	-0.00033	0.00066	-0.00073	0.00039
# of strikes	(-1.0220)	(0.1432)	(-0.3278)	(0.6312)	(-0.7589)	(0.3895)
	[-0.000 , 0.000]		[-0.000 , 0.000]		[-0.000 , 0.000]	
% winning	5.72016	2.28041	6.59204	3.84081	6.73800	3.89376
	(3.7937)	(1.4254)	(4.7290)	(2.5788)	(5.1660)	(2.7814)
	[0.878 , -0.145]		[0.903 , 2.5788]		[0.943 , 0.024]	
Log-likelihood	-1588.57		-1896.39		-2089.96	
K-L R-Sq	0.1672		0.1713		0.1641	
N	1755		2104		2307	

TABLE 6
Determinants of Strike Duration

			Competing Risk Model		
Variable	OLS	Hazard	Success	Fail	Compromise
Constant	1.75197	1.75861	1.26043	2.01728	1.99581
	(54.856)	(56.347)	(24.615)	(40.387)	(36.825)
			Strikers		
Strikers	0.00012	0.00013	0.00007	0.00014	0.00007
	(2.2934)	(2.3590)	(0.7107)	(0.7394)	(0.8498)
		[0.0007]	[0.0002]	[0.0010]	[0.0005]
Female Strikers	0.13505	0.11599	0.33020	0.15290	0.08749
	(1.2931)	(1.1751)	(2.0575)	(0.9200)	(0.4956)
		[0.6926]	[1.2481]	[1.2016]	[0.6572]
Firms	0.00439	0.00325	0.00441	0.01444	0.00689
	(1.6957)	(1.2004)	(1.1464)	(1.8196)	(1.7511)
		[0.0189]	[0.0156]	[0.1086]	[0.0507]
			Strike Issues		
Strike Issues:					
Multiple	0.60301	0.67532	0.53494	0.95080	0.43941
	(5.9412)	(6.8336)	(3.1670)	(5.6475)	(2.4103)
		[4.7289]	[2.1810]	[9.9841]	[3.4972]
Wage	0.27194	0.34262	0.23044	0.38855	0.32666
	(3.0234)	(3.8401)	(1.5607)	(2.9441)	(1.7968)
		[2.0472]	[0.8272]	[3.0470]	[2.4478]
Union	0.49354	0.51832	-0.09928	1.11783	0.48795
	(3.0690)	(3.4510)	(-0.3641)	(4.9481)	(1.2715)
		[3.8389]	[-0.3353]	[14.505]	[4.5572]
Working	-0.06663	-0.04284	-0.09791	0.01228	-0.01485
Conditions	(-0.4110)	(-0.2880)	(-0.4117)	(0.0540)	(-0.0378)
		[-0.2439]	[-0.3306]	[0.0928]	[-0.1085]
			Union		
Union	0.85141	0.83478	0.65732	1.06138	0.81349
Involvement	(7.6749)	(7.7832)	(3.6437)	(6.0360)	(4.3139)
		[4.0638]	[1.9776]	[6.6208]	[5.0071]

International Union	-0.04306 (-0.4370)	-0.04379 (-0.4718) [-0.2552]	0.07271 (0.4597) [0.2543]	0.02966 (0.1889) [0.2225]	-0.25466 (-1.5959) [-1.9207]
			Strike Characteristics		
Year	0.06620 (0.5061)	0.03779 (0.2951) [0.2193]	-0.05280 (-0.2417) [-0.1862]	-0.36465 (-1.7697) [-2.7414]	0.55533 (2.4197) [4.0862]
Year x Year	-0.00213 (-0.9837)	-0.00163 (-0.7710)	-0.00026 (-0.0721)	0.00524 (1.5438)	-0.01009 (-2.6716)
Violence	0.79468 (4.4135)	0.76972 (4.5639) [6.5505]	-0.18133 (-0.3981) [-0.5867]	0.51622 (2.0823) [4.9783]	0.86203 (3.2202) [9.6358]
Lockout	0.62729 (3.0027)	0.72520 (3.4927) [6.0711]	0.63019 (1.8551) [3.0570]	0.25174 (0.8653) [2.1349]	1.05805 (1.8693) [13.533]
Replacement Workers	0.64764 (6.4463)	0.69899 (7.5942) [5.3883]	2.53328 (4.2040) [40.196]	0.33216 (2.8448) [2.6933]	-0.25148 (-0.8161) [-1.6483]
			Region		
Location:					
West	0.26040 (2.8218)	0.29416 (3.3800) [1.8390]	0.06848 (0.4621) [0.2457]	0.42358 (2.9533) [3.5189]	0.33944 (2.1157) [2.7428]
Quebec	-0.04753 (-0.5003)	-0.03478 (-0.3772) [-0.1997]	0.05890 (0.3651) [0.2115]	-0.16622 (-1.1218) [-1.1872]	-0.07858 (-0.4784) [-0.5636]
East	-0.20019 (-1.6714)	-0.21637 (-1.8429) [-1.1695]	-0.07809 (-0.3795) [-0.2676]	-0.37130 (-2.0711) [-2.5083]	-0.35984 (-1.7046) [-2.3487]
			Industry		
Apparel and Textiles	0.52605 (2.2952)	0.62113 (2.9355) [4.4342]	0.14277 (0.3378) [0.5230]	1.30575 (3.7712) [16.281]	0.53480 (1.7182) [4.7486]
Building Trades	0.19502 (0.8390)	0.30072 (1.3785) [1.9802]	0.16824 (0.3979) [0.6359]	0.57532 (1.5464) [5.6133]	0.31374 (0.9844) [2.6096]
Unskilled	-0.31335 (-1.2116)	-0.23952 (-0.9290)	-0.14480 (-0.3239)	0.24076 (0.5743)	-0.44767 (-0.8607)

		[-1.2478]	[-0.4791]	[2.0273]	[-2.6807]
Food and Tobacco	0.19116 (0.7327)	0.18713 (0.7822) [1.1860]	-0.25753 (-0.5634) [-0.8096]	1.02762 (2.5874) [13.037]	-0.00381 (-0.0105) [-0.0280]
Machine	0.59336 (1.4652)	0.62375 (1.7884) [4.9993]	0.20713 (0.3545) [0.8103]	0.64869 (1.1459) [6.8255]	1.65254 (2.6958) [30.623]
Metals	0.76910 (2.8847)	0.88282 (3.4652) [7.9762]	0.08017 (0.1226) [0.2940]	1.48558 (3.5389) [24.560]	0.72140 (2.0180) [7.4327]
Mining	0.20958 (0.9645)	0.25978 (1.2984) [1.6354]	0.34175 (0.8603) [1.3536]	0.27411 (0.8322) [2.2156]	0.36277 (1.1976) [3.0406]
Shoes and Other Skilled	0.75559 (2.8504)	0.87379 (3.3837) [7.8252]	0.07918 (0.1649) [0.2898]	1.54766 (3.3719) [26.425]	0.87999 (2.2926) [9.9106]
Transportation and Utilities	-0.13464 (-0.5934)	-0.07129 (-0.3426) [-0.4016]	-0.24969 (-0.6212) [-0.7974]	0.22566 (0.6592) [1.8712]	0.06235 (0.1930) [0.4713]
Wood Products	0.59188 (2.5635)	0.71509 (3.2919) [5.7538]	0.53938 (1.2486) [2.4533]	0.71558 (2.0750) [7.4014]	0.84690 (2.5168) [9.1278]
Service and Public Sector	0.17013 (0.7175)	0.26434 (1.2053) [1.7253]	-0.09354 (-0.2221) [-0.3170]	0.57793 (1.6035) [5.6363]	0.43862 (1.2497) [3.9548]
Miscellaneous Manufacturing	0.52903 (2.3175)	0.59122 (2.8328) [4.4294]	-0.10902 (-0.2608) [-0.3677]	1.21956 (3.4784) [16.164]	0.64367 (2.1718) [6.1778]
Unemployment Relief Workers	0.36925 (1.1149)	0.45249 (1.5490) [3.2983]	0.54779 (1.0065) [2.5536]	0.59091 (1.4148) [5.9744]	0.98781 (0.6906) [12.324]
			Output Effects		
Output Effects:					
GNP	-0.00042 (-1.8324)	-0.00044 (-1.8755) [-0.0025]	-0.00083 (-1.9191) [-0.0029]	-0.00042 (-1.2809) [-0.0032]	0.00067 (1.2334) [0.0049]

Union presence	0.00015	0.00017	0.00042	0.00015	-0.00043
x GNP	(0.7950)	(0.9070)	(1.2614)	(0.5002)	(-1.2061)
		[0.0010]	[0.0015]	[0.0011]	[-0.0032]
Union issue	0.00052	0.00065	-0.00033	0.00104	0.00236
x GNP	(1.2375)	(1.7711)	(-0.5390)	(1.6280)	(1.9750)
		[0.0038]	[-0.0012]	[0.0078]	[0.0174]
Wage Issue	0.00018	0.00021	0.00036	0.00008	-0.00030
x GNP	(0.8376)	(1.0218)	(0.9979)	(0.2721)	(-0.6160)
		[0.0012]	[0.0013]	[0.0006]	[-0.0022]
Work Cond	-0.00042	-0.00043	-0.00025	-0.00001	-0.00088
x GNP	(-1.0750)	(-1.2202)	(-0.3754)	(-0.0254)	(-0.9584)
		[-0.0025]	[-0.0009]	[-0.0001]	[-0.0065]
Multiple Issue	0.00026	0.00026	0.00023	0.00064	-0.00068
x GNP	(1.0558)	(1.0746)	(0.5256)	(1.5464)	(-1.3484)
		[0.0015]	[0.0008]	[0.0048]	[-0.0050]
1929-33 Dummy	-0.10121	-0.10423	-0.06043	0.18473	-0.30200
	(-0.8249)	(-0.8673)	(-0.2915)	(0.9948)	(-1.3210)
		[-0.5877]	[-0.2095]	[1.4565]	[-2.0196]
			Strike Waves		
Strike Wave	-0.00102	-0.00100	-0.00162	-0.00188	0.00103
# of Strikes	(-1.8842)	(-1.8516)	(-1.7550)	(-2.1322)	(1.1943)
		[-0.0058]	[-0.0057]	[-0.0142]	[0.0076]
% winning	-1.58937	-1.24642	-0.86259	1.37659	-2.03460
	(-2.1933)	(-1.8188)	(-0.8166)	(1.1951)	(-1.5339)
		[-7.2347]	[-3.0423]	[10.349]	[-14.971]
P		1.33544	1.43616	1.36992	1.54833
		(45.498)	(25.976)	(28.766)	(24.311)
Log-likelihood	-2980.94	-6062.56	-1703.42	-2552.83	-1682.41
Jaggia Statistic		35.4	6.262	9.409	0.279
N	1755	1755	589	692	474
R-sq	0.2876				

TABLE 7
Wage Settlements (% Change) by Duration

Duration	All Strikes	Wins	Compromises	Losses
All	16.73	28.10	15.56	0.07
1-3 days	19.38	28.86	18.60	0.00
4-7 days	19.67	37.34	14.56	0.00
8-14 days	15.38	30.35	14.04	0.00
15-21 days	17.05	22.03	25.63	0.00
22-28 days	10.49	9.93	15.71	1.92
29-35 days	5.16	8.68	10.40	-2.28
36-42 days	10.38	9.20	10.68	
43-60 days	7.6	16.46	10.70	0.96
61-90 days	3.6		10.80	0.00
91-120 days	3.9		3.90	
Over 120 days	11.88	29.30	10.03	0.00

Notes: Wage settlements for strikes over wages.

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