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The Effects of Strikes and Strike Length on Negotiated Wage Settlements

Craig W. Riddell

This study investigates the effects of strikes and strike length on negotiated wage settlements in Canada using a large body of individual contract data. The main novelty of the paper is the inclusion of both a strike/no strike dummy variable and the length of the strike if one occurred in an equation explaining wage changes. This allows for the possibility (and thus tests the hypothesis) that the occurrence or non occurrence of a strike and the length of the strike if one occurred have separate effects on the negotiated settlement.

A number of previous studies have included a strike or strike activity variable in the wage equation. These studies can be divided into two types: those using an aggregate wage index to form the dependent variable and those using individual contract data. In the first type the strike activity variable (e.g. number of strikes during the period or man-days lost due to strikes) is usually interpreted as a measure of trade union militancy. Examples include Ashenfelter, Johnson and Pencavel (1972), Godfrey (1971), Godfrey and Taylor (1973), Johnston and Timbrell (1973) and Swidinsky (1972). These studies generally find that the strike activity variable has a positive effect on wage changes. In studies employing individual contract data the hypothesis tested is that settlements involving a strike differ in their determinants from settlements not involving a strike. This differs from the aggregative studies which implicitly if not explicitly hypothesize that all wage changes during a period of high strike activity are a certain amount higher than they would otherwise have been rather than simply those settlements involving a strike. Examples of this second type of study include Sparks and Wilton (1971), Mills (1971) and Cousineau and Lacroix (1977).

The studies using individual contract data generally find that the strike dummy is significant and has a positive sign. The Sparks and Wilton (1971) and Mills (1971) studies (the latter was a cross section while the former a pooled time series cross section) obtained strike dummy coefficients of about one, indicating that settlements involving a strike are about one percent higher, other things equal, than non-strike settlements. Cousineau and Lacroix (1977) obtained a coefficient of just over one-half; they also found that the coefficient was smaller (0.34) and not significantly greater than zero (at the five percent level) when the transportation, communication and utilities sector was excluded.

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Two points should be noted about the relationship between these two types of studies. First, as suggested above, aggregative studies are based on the hypothesis that 'union militancy' or 'trade union pressure' varies from period to period and has a positive effect on all wage changes negotiated during the period; strike activity is simply a proxy for trade union pressure. The individual contract studies are not based on any notion of strike activity being a proxy for trade union pressure, but are based on the hypothesis that settlements involving a strike differ from other settlements. Second, if settlements involving a strike result in a higher wage change than those not involving a strike then periods in which an above average number of strikes occur will have an unusually high (given other economic conditions) percentage change in the aggregate wage index so that it will appear that trade union militancy (as measured by strike activity) is having a positive effect on wage settlements even though that may not be the case. On the other hand, even if individual settlements involving strikes do not differ in any way from those not involving strikes (so that the strike dummy in the individual contract studies is insignificant) it may still be true that strike activity has a significant effect on the overall percentage change in wages.

This study belongs to the second group in that individual contract data is employed, and the hypothesis to be tested is that settlements involving a strike differ from other settlements. Besides obtaining additional evidence which tends to support the findings of the other studies based on individual contracts, the study is the first to include both a strike dummy variable and a variable measuring the duration of the strike (this is zero if no strike occurred)¹. The rationale for doing this is that some theories of the bargaining process (these are discussed more fully below) place considerable emphasis on the rate at which workers' demands or expectations decline and/or the rate at which the firm's offer rises as the length of the work stoppage increases. While it may not provide a definitive test, evidence on how the negotiated wage change is affected by the length of the strike, given that a strike in fact occurred, will clearly be of some relevance to these theories.

Many solutions to the bargaining problem (see, e.g., the survey in chapter two of de Menil (1971)) are inconsistent with the occurrence of strikes in that the nature of the problem implies a certain 'pie' to be divided between the two players and a strike of any duration reduces the size of the pie thus harming both sides. This outcome is inconsistent with the kinds of rationality postulates which underlie the theory which provides the solution in the first place. According to these theories, strikes only occur because of 'irrationality', communication failures or miscalculations of the other side's intentions. If these are the major factors accounting for strikes, then it is not at all clear that there should be any significant relationship between the occurrence of a strike and the final wage settlement. For example, if the strike occurs because of miscalculations based on lack of information about the other side's true intentions, then the strike period is one in which inappropriate views or information becomes amended, and the final settlement

¹ COUSINEAU and LACROIX use the strike dummy and the duration of the strike as alternative strike variables.

will be, on average, no different from one not involving a strike. A useful discussion of this line of argument is contained in Cousineau and Lacroix (1977, chapter 6).

A leading theory explaining the occurrence of strikes and the joint determination of the wage rate is that of Ashenfelter and Johnson (1969). This theory follows Ross (1948) in emphasizing that the union leaders and union members are distinct groups with (at times) differing objectives. Union leaders gather information about the expectations of the workers, but they also have much better information about the firm's ability to pay than do the workers. When the worker's expectations are higher than the final wage settlement which can be realistically be expected, the union leadership faces a dilemma. They can either agree to this 'realistic' wage and benefits package which has the appearance of 'giving in' to the firm's offer or they call for a strike which has the function of reducing the workers' expectations until they coincide with what the firm is willing or able to pay at which time a settlement is reached. More specifically, there is a 'concession schedule' which describes the rate at which the workers' expectations decline as the duration of the strike increases. The firm is faced with this schedule and chooses the strike duration (which may be zero in which case the firm meets the worker's initial demands) and therefore settlement wage which maximizes the firm's net present value. The trade-off is that a longer strike means greater losses of profits during the strike which lowers net present value but also means a lower final wage which raises net present value.

The main difficulties with this approach would appear to be its reliance on rather unsophisticated worker behavior and its one-sided nature. With respect to the latter it could be argued to be equally plausible, as Eaton (1972) has suggested, for the workers to take the firm's concession schedule as given and to pick the optimal (utility maximizing) strike duration, trading off the loss in present income from a longer strike against the gain in future income due to the firm's concessions.

Of course, a more general theory would involve concession schedules on both sides, with both parties having imperfect information about the other's intentions. Unfortunately it is very difficult to generate testable implications with such a model (see, e.g., Rabinovitch and Swary (1976)). Thus it may be necessary to choose between a model in which, as in Ashenfelter and Johnson (1969), the firm chooses the strike length and one in which, as in Eaton (1972) and Swidinsky (1972) the workers choose the strike length in order to avoid a theory in which 'anything can happen'. Further, because of the large number of possibilities which can occur, at least in principle, in a bargaining situation there is a need for incorporating as much empirical content as possible into bargaining theories in order to obtain refutable predictions. This is part of the motivation behind this paper. In particular, it is suggested that if the Ashenfelter and Johnson theory is correct then we should observe, other things equal, a negative relationship between the negotiated wage change and the length of the strike, while if the firm's concession rate tends to dominate that of the workers so that the Eaton type of model is more appropriate we should observe, other things held constant, a positive relationship between the wage settlement and the duration of the strike.

The empirical results reported in Table 1 tend to support the latter of these two theories, and therefore suggest that the view of the workers deciding whether or not to strike and on the length of strike given a concession schedule for the firm tends to be more descriptive of bargaining situations than that in which the firm is cast in this role. Columns 1 and 3 report regression equations estimated without the strike dummy (STRIKE) and the length of the strike in days (DAYS) while columns 2 and 4 report the same equations when these two variables are included. Both the strike and length of strike variables are significant and positive. The size of the coefficients make the results comparable to those of Sparks and Wilton.

TABLE 1

	(1)	(2)	(3)	(4)
Constant	-2.01 (-6.8)	-1.97 (-6.7)	-0.50 (-1.7)	-0.50 (-1.7)
U^{-1}	26.53 (21.9)	26.22 (21.7)	16.39 (12.5)	16.39 (12.6)
ΔU	0.79 (13.7)	0.79 (13.5)	0.56 (9.7)	0.56 (9.8)
PE	1.67 (34.8)	1.64 (33.7)	1.63 (33.4)	1.61 (33.0)
CATCH			0.26 (8.3)	0.14 (7.9)
STRIKE		0.86 (2.2)		0.87 (2.4)
DAYS		0.019 (2.2)		0.015
\bar{R}^2	0.36	0.37	0.43	0.44

Figures in parentheses are t statistics.

Since this paper represents a small extension of a larger study reported in Riddell (1979), there is not much need to give details of the other variables and their construction, the sample, etc. The following brief remarks will suffice. The sample covers the period 1953 to 1973 and includes 2360 contracts from 18 Canadian 3 digit level industries, mostly manufacturing. The dependent variable is the annualized percentage increase in the base wage rate over the life of the agreement. Increments occurring early in the contract are weighted more heavily than those occurring in the second or third years. The explanatory variables are a constant term, the inverse of the national unemployment rate in the month in which the contract was signed (U^{-1}), the change in the unemployment rate over the previous six months (ΔU) and the expected rate of inflation at the time the contract was signed (PE). Equations (1) and (2) employ these variables and are based on the full sample of 2360 contracts. A catch-up variable (CATCH), measured as the difference between the expected rate of infla-

tion at the time the previous contract was signed and the actual rate over the previous contract times (i.e. the difference times) the length of the previous contract in months, is included in equations (3) and (4). These equations are based on 2284 contracts covering the period mid-1953 to 1973. (Contracts in the first half of 1953 had to be dropped because there is no recorded previous contract on which to calculate the catch-up variable). All of the variables have the predicted (or at least expected) signs. The U^{-1} coefficient indicates a fairly steep short-run Phillips curve, and the positive sign on ΔU implies clockwise loops around the Phillips curve. The PE coefficient is rather large compared to the predicted value of unity; this finding is examined in Riddell (1979). The positive sign on CATCH indicates that if inflation is higher than was expected, then the subsequent wage settlement will be higher than it would otherwise have been.

In summary, the results shown in Table 1 indicate that both the occurrence of a strike and the length of the strike affect the negotiated wage change, after controlling for economic conditions (expected inflation, the state of excess demand in the labour market, etc). The positive sign on the length of strike variable is much easier to reconcile with the view that the firm's concession rate tends to dominate that of the workers than with the Ashenfelter-Johnson view of the bargaining process. The positive coefficient on the STRIKE variable tends to confirm the findings of other studies which indicate that settlements involving a strike result in wage changes that are one-half to one percent higher than would otherwise be the case.

Three comments should be made concerning the assessment of these empirical results. First, there are several important reasons to prefer results based on individual contract data over those based on wage or earnings index data; these are discussed by Hamermesh (1970) and Riddell (1979) among others. Second, if, as indicated by our results, strikes result in higher settlements than would otherwise have occurred and if these settlements 'spill over' and affect subsequent non-strike settlements (perhaps mainly those in the same region or same industry) then the effects of strikes as estimated in Table 1 will be understated. Third, it could be argued that the entire parameter vector associated with strike settlements will differ from that associated with non-strike settlements rather than just the constant term differing (which is the maintained hypothesis when a strike dummy variable is used). This more general specification is employed by Auld et al. (1978); it could not be employed here because the number of settlements involving a strike was too small to permit a separate equation to be usefully estimated; further, it is not clear how to incorporate strike length in this specification as the argument for different determinants of strike and non-strike settlements applies equally well to settlements involving strikes of different durations.

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