

Analyses of Industrial Actions : Some Statistical and Methodological Issues

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In this article the author sets out to discuss the nature of strike statistics and their limitations. The shortcomings of the econometric approach to analyses of strikes have been widely discussed, followed by an examination of the empirical approach. He concludes that a simple statistical approach with an aim to understand the trends, inter-industry, inter-region strike propensities and seasonalities would be of more practical value.

In recent times, strikes and lock-outs have attracted the attention of the public as well as academicians alike. This attention has culminated in a number of studies, mainly in the US, Canada, and Britain, with a quantitative approach. In the efforts to analyse and explain the strike phenomenon (which for academic purposes includes lock-outs), serious methodological problems had to be grappled with. While some made efforts by raising fundamental questions as to the ultimate aim of such analysis, the rationale of choosing one strike variable over the others, the need or otherwise of standardising the data, etc, others have merely followed earlier studies or fitted the data to a model or method already devised. This has led to a number of studies which are not comparable with one another due to diversity in approaches and treatment of data and whose conclusions are debatable. An attempt is made in this paper to discuss the shortcomings of the data and consider the methodological constraints and pitfalls confronting the studies on strike activity.

I

Development of any theory depends, to a large extent, on establishing facts with the help of sound methodology and data. The problems of research on industrial actions are mainly due to the nature of data on strikes which are published on similar lines in most countries.

In India, strike statistics are published by the Labour Bureau, Simla. In compiling these statistics, an "industrial dispute" is taken as a temporary stoppage of work by a group of employees or by an employer on matters relating to employment or unemployment or terms of employment or conditions of service. On the British pattern, an industrial dispute denotes both types of work stoppages, popularly termed as strikes and lock-outs. However, political strikes, sympathetic demonstrations, *gherao* and the like are excluded from these statistics as they are deemed to have no direct relevance to the relations between labour and management. Closures on account of shortages

of raw material, breakdown of machinery, etc, which are not connected with "industrial dispute" is synonymous with strikes which should include lock-outs, but exclude other industrial actions. Any attempt to separate strikes and lock-outs will be infeasible as no distinction is made between lock-outs preceding or succeeding a strike and pure employer initiated lock-outs.

In the collection of strike statistics only those work stoppages that involved ten or more workers and lasted at least a day are taken into consideration. The Labour Departments of the State governments collect information on work stoppages in various sectors but the Labour Bureau considers that the coverage in the organised sectors, such as mining, quarrying and manufacturing is more satisfactory than the less organised sectors, such as construction, commerce, services, etc, as the statistics with respect to the latter are collected on voluntary basis.¹

The concerned departments collect the required information on uniform lines but take cognisance of only those work stoppages which come to their notice either directly or from police records. Thus, there is the possibility of strike statistics being underestimated. Commenting on the British system of statistics, Hyman says: "... Some of whom may be more efficient, or scrupulous than others. Situation may compel companies to be liberal or restrictive in their recording; the firm wanting to give an impression of harmonious industrial relations may turn a blind eye to certain disputes; employers keen to provide evidence for legal restrictions on the right to strike may record numerous minor incidents

which would otherwise go unrecorded."² This may apply to India also wherever reporting is voluntary. It has been commented by the government officials that the discretion is vested with the labour officials also as some may want to record every single dispute coming to their notice, while others may ignore minor incidents and take into consideration only the major ones which may go on record to other levels in the department.

The other measure, that of the workers involved, represent the maximum number of workers affected directly or indirectly on any one day during the workstoppage. This is likely to contain an inherent defect since the number of workers involved at the precipitation of the strike may undergo substantial change presenting an entirely different picture at the end of it. Experience indicates that this definition results in an overstatement as it often represents the maximum number of workers involved. Further, if strikes occur more than once in the same unit the number of workers involved in a year may even exceed the employment strength.

The mandays lost measure is obtained by adding up the resultant absences, caused directly or indirectly by the work stoppage in each shift of a potential working day. Weekly offs and other scheduled holidays are excluded from the computation of the mandays lost. This may be slightly inflated as the potential absenteeism is not deducted from the resultant absences. However, in view of the possibilities of unreported strikes, the mandays lost on the whole may tend to be an understatement.

1. Report. Industrial disputes resulting in work stoppages in India during 1975. *Indian Labour Journal* November 1976, pp. 22-6.
2. Hyman R. *Strikes*. London, Fontana/Collins, 1972, p. 26.

Strike statistics are thus incomplete since minor incidents are not reckoned, and industrial actions not arising out of labour-management disputes but nonetheless having industrial consequences are also left out.³ This is further confounding as no distinction is realistically possible between strikes and lock-outs. Apart from these general limitations of the strike statistics, a more serious problem relates to methodology, that of choosing an appropriate measure to represent the strikes.

Choice of a Measure

There is no comprehensive indicator of strikes and none of the three measures, namely, number of strikes, workers involved, and mandays lost, is a homogeneous indicator. Though the number of strikes may be one of the indicators of industrial discontent, it is not a measure capable of indicating the magnitude or impact of strikes which is also of considerable concern. The measure of workers involved, on the other hand, does not indicate whether it is the result of a few strikes employing large number of workers in industries or whether they are accounted by a large number of sporadic strikes spread over the economy. The mandays lost measure also does not denote whether it is the product of a large number of strikes,

long duration strikes or strikes involving large number of workers.

Robert Stern⁴ has made an illuminating analysis of 26 studies starting from that of Alvin Hansen.⁵ He found that 14 of these studies used all three measures thus overcoming the problem of choosing one variable over the others. It was also found that most of the studies—twenty two in number—used the strike frequency as a measure.

Econometric studies, which have received an impetus with the work of Ashenfelter and Johnson,⁶ have been criticised for adopting mostly the strike frequency as the dependent variable as it would mean using "highly unreliable data, especially those which relate to the private sector or manufacturing industry".⁷ Instead, some economists believe that the measure of mandays lost is the most comprehensive indication of the strength of labour disputes from an economic point of view as it constitutes a rough index of the economic cost of strikes.⁸ This suggestion cannot be accepted across the board for all analyses of strike activity as mandays lost is the effect rather than the phenomenon of strikes. Even from an economic viewpoint this is an imperfect measure of the cost of strikes to the economy. The impact of

3. It is estimated that 30 per cent of strikes in coal mining and 80 per cent of them in motor industries remained unreported in official statistics in Britain in 1960s.

Turner H A. *Is Britain Really Strike Prone — A review of the Incidence, Character and Costs of Industrial Conflict*. Occasional Paper No. 20, Cambridge University Paper, 1969. p. 8.

4. Stern R. Quantitative strike analyses — Some methodological issues. *Industrial Relations*, February 1972, pp. 32-42.

5. Hansen A. Cycles of strikes. *American Economic Review*, December 1921. pp. 616-21.

6. Ashenfelter O, Johnson G. Bargaining theory, trade unions, and industrial strike activity. *American Economic Review*, March 1969.

7. Evans E W. On some recent econometric models of strike frequency. *Industrial Relations Journal* Autumn 1976, p. 75.

8. For instance, Forchheimer W. Some international aspects of the strike movement. *Bulletin of the Oxford Institute of Statistics*, January 1948, p. 9; Silver M. *Op. cit*; Vanderkamp J. Economic activity and strikes in Canada. *Industrial Relations*, February 1970.

Strike is dependent on a number of variables as the "cultural necessity", "stock effect" and the "substitutability effect", and the aggregate figure irrationally lumps the number of mandays lost in a two-day strike of all night clubs with a month-long strike in hospitals.⁹

Faced with this problem of choice, Galambos and Evans¹⁰ constructed a common index for strike activity by calculating the arithmetic mean of the three measures without assigning any weightage whatsoever. They argued that any effort at apportioning weightage for these three different measures would be pointless unless the importance or significance of these measures is defined and that their index was not intended to measure hardship, loss of output, damage to the economy or any other of the possible consequences of stoppages. However, this approach does not serve any purpose as such numbers would be reduced to a mere abstraction ignoring the even: as well as its implications.

It is commonly believed by most researchers that the three traditional measures of strikes are three different dimensions of the phenomenon (in the sense of a three dimensional breakdown) overlooking that they are also separate stages in a process. What is central to a study is the outbreak of a strike without which others do not appear. Once a strike is declared, the size of work-force in a way determines the workers involved.¹¹ While this may be

termed as the process, the mandays lost is the ultimate outcome.

Apart from mandays lost there are other effects of strike on which indices may be constructed, for instance, earnings lost, and production lost. If mandays lost were treated as a dimension of strike phenomenon then these may also have to be deemed as further dimensions. That way, the dimensions of a strike phenomenon should be as many as the number of related indices compiled, which would be irrational.

There are many events in the society that are being studied and it is hard to find one where the effort is to combine the events, process, and the effects into one. Thus, unless the aim of the study is explicitly one of analysing the participation or mandays lost due to strikes, any study of strike activity *per se* should deal with the frequency of strikes only.

Standardising Strike Measure

Though most earlier studies used raw counts, for a meaningful analysis standardisation is necessary, as strike measures may be sensitive to changes in the labour force and other variables. This brings in the problem of choosing the denominator with which the strike variable ought to be standardised. The denominator chosen should have relevance to the major aim of the study and should also *a priori* have some relation with the strike measure used. For instance,

9. Chamberlain N W, Schilling S M. *The Impact of Strikes: Their Social and Economic Costs*. New York, Harper, 1954; Fisher M. *Measurement of Labour Disputes and their Economic Effects*. Paris, OECD, 1973.
10. Galambos P, Evans E W. Work stoppages in the UK: 1951-1964: A quantitative study. *Bulletin of Economic Research*, March 1973.
11. The workers involved represent the maximum number of workers affected directly or indirectly on any one day of the entire work-stoppage. Thus, normally all the workers in the striking department, organisation or industry are affected.

making agricultural employment as a denominator for total work-stoppages in India would be meaningless. For this reason, the conclusions of Ross and Hartman¹² are questionable as they used total employment instead of non-agricultural employment. Also, the denominators, such as union membership used by Ross and Hartman are inappropriate in such studies aiming at analysis of trends in strike activity. Such measures may prove useful if the aim of the study were the propensity of unionised workforce to strike.

The most accepted deflator is the population of work-force. This apart, workers involved is sensitive to the strike frequency, and mandays lost is sensitive to the other two measures. Considering these aspects it is advisable to use the following deflators depending on the purpose of inquiry :

first ratio may indicate the frequency, the next two would indicate the participation (or intensity) of strikes. The fourth and fifth ratios may be indicative of loss due to strikes. There is, however, a dilemma that a researcher would face in the usage of the last one. While most researchers have used it to denote the duration of strike, some have pointed out that since the numerator is common to loss due to strikes as well as duration the ratio should be taken to be indicative of the loss.

On the other hand, some have considered the fourth, fifth, and sixth ratios as duration thus ignoring loss as an aspect of strike activity.¹⁴ This, however, is inappropriate as will be shown here. The figure of mandays lost is dependent mainly on the number of workers involved and the duration of strikes. Put in another way, if :

Measure	Deflators	Possible Ratios
Strike frequency	Estimated non-agricultural employment	Strikes per 1,000 employees
Workers involved	Estimated non-agricultural employment	Workers involved per 1,000 employees
	No. of strikes	Workers involved per strike
Mandays lost	Estimated non-agricultural employment	Mandays lost per 1,000 employees
	No. of strikes	Mandays lost per strike
	No. of workers involved	Mandays lost per work involved

The ratios given in the table represent different aspects of strikes.¹³ While, the

y = mandays lost, a = workers involved, and b = actual duration of the strike, then

12. Ross A M, Hartman P T. *Changing Patterns of Industrial Conflict*. New York, John Wiley, 1960.

13. These measures were also used by Pandey S M, Pathak V K. Inter-industry conflict proneness in India. *Indian Journal of Industrial Relations*, April 1972.

14. For example, Stern R N. *Op. cit.*

$$y = a b \text{ and } b = y/a$$

Duration can only be measured by the ratio of mandays lost per worker involved. No such relationship can be found between mandays lost, duration, and other numerators. Hence the fourth and fifth ratios cannot be indicative of duration. In the analyses of strike activity there are, thus, four aspects that may be studied.

In econometric studies, however, there is no problem in the choice of the denominator for standardisation as raw counts may be used. The strike measure is treated as the dependent variable and the employment measure (which is the common deflator) is included in the specified model as an independent variable. "Once the projects' aim includes the determination of the effects of labour size (or any population base) on strike rates, most deflators are inappropriate, as they build in correlations (or definitional dependence) between independent variables (of population size) and the denominator of the ratio dependent variable (e. g. work stoppages per worker in the labour force)."¹⁵

II

Another methodological issue in a larger sense is the merit of undertaking an econometric study based on aggregated data *vis a-vis* the "empirical approach" which merit mean studying the strike as it occurs. The exchange between Eric Evans and David Sapsford is illustrative of the differing opinions in this regard. This has also been the point of argument between sociologists and economists both of whom have been accused of disciplinary parochialism.

Econometric Approach

A major indictment of the econometric analyses of strikes is that they deal with inadequate and unreliable data at the macro level. Also, those studies which use frequency as the strike measure have been viewed as suspect as they do not measure a collection of homogeneous events — "A measuring rod not composed of comparable unit can never be of more than limited value."¹⁶

Secondly, the ability of econometric models to predict the nature and extent of strikes is rather low and none of the studies till now attempted at forecasting strike activity. This is because "the parameters derived will only predict, forecast or explain strike frequency when applied to actual values for the independent variables which are not, of course, available in advance. Forecasting the values of these variables is never even attempted, for obvious reasons, and the obstacles may be insurmountable."¹⁷

Thirdly, though a few econometric analyses have established the relationship between economic variables and strikes the strength and direction of such relationship is fluctuating. However, studies seem to be in search of high co-efficients of determination for explanation for the fluctuations in relationship. For instance, it has been established that the timing of changes in the level of strike activity is associated with the business cycle. But "this relationship is not consistent; that is, although strike frequency fluctuates with the business cycle, in different cycles the same level of

15. *Ibid.* p. 35.

16. Evans E W. On some recent econometric models of strike frequency — A further comment. *Industrial Relations Journal*, Winter 1978, p. 73.

17. Evans E W. On some recent econometric models of strike frequency. *Industrial Relations Journal*, Autumn 1976, p. 75

unemployment may be associated with different rates of strike activity."¹⁸ Thus, the explanation of strikes through econometric studies is only partial.

Lastly, most of these studies use single equations treating one party as the aggressor and the other as a passive respondent. It is unlikely that their "two or multi-party character or the intricate nature of the negotiating/strike process of threat, response, offer, counter offer, etc. can be adequately represented by a single equation."¹⁹ Further, most of these studies ignore the institutional factors connected with political climate and trade union organisations. These may be ignored in a country where the industrial relations system is institutionalised, that is, when collective bargaining is established, trade union membership and the political position of labour are stable. But not in countries, such as India, France, and Italy.²⁰ Some have tried to include the organisational and political factors in the model. However, the variables selected are the union density, for the former, and factors like party of the president, for the latter, which are poor representatives of the organisational and political factors.

Empirical Approach

On the other hand, the empirical approach resulting in a survey case study may not be able to overcome these problems and provide a good substitute. The case study approach has mostly been adopted by sociologists who devised models for explaining industrial action on the basis of union

size, membership commitment, inter-and intra-union rivalry, attitude of the managements, etc. These variables determine the relative organisational power of labour and management which is central to such studies. However, these studies have a serious drawback in that they are not being amenable to generalisation. The conclusions of a study which exposes the uniqueness of the situation may have little practical relevance to others. Further, the empirical approach also would result in a post-mortem analysis giving a lot of hindsight and little future perspective. More importantly, case studies have always been made of large important undertakings and where the industrial action has taken an interesting turn to have attracted the attention of the public. The routine and common strikes which account for the bulk of industrial actions are left out of focus.

Statistical Approach

Surprisingly, some of the studies which made considerable impact on this discipline have steered clear of these extremities and analysed data over a period of time to understand the extent and nature of strike activity. Despite the criticism on methodological grounds the studies of Knowles, Kerr and Siegel, Ross and Hartman, and a few others used the simple statistical approach and have come to significant conclusions.

In a way, the studies on strikes have started with Knowles²¹ who made the first comprehensive analysis of the activity in

18. Edwards P K. Time-series regression models of strike activity: A reconsideration with American data. *British Journal of Industrial Relations*, November 1978, p. 330.
19. Sapsford D. On some recent econometric models of strike frequency: A reply. *Industrial Relations Journal*. Spring 1978.
20. Snycer D. Institutional setting and industrial conflict: Comparative analyses of France, Italy, and the US. *American Sociological Review* 1975, pp. 259-78.
21. Kerr C, Siegel A. The inter-industry propensity to strike: an international comparison. In Kornhaver A, Dubin R, Ross A M. Eds. *Industrial Conflict*. New York, McGraw Hill, 1954.

