Industrial Dispute Tactics in Australian Manufacturing

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Industrial action has been the subject of considerable economic research, but most research has focused exclusively on strikes and has ignored the fact that workers can use tactics other than strikes in resolving disputes. The fact that workers engage in forms of industrial action other than strikes raises important questions: What determines the incidence of nonstrike action, and how do these determinants compare with strikes? This article uses a recently developed dispute-level data set of both strike and nonstrike actions in Australian manufacturing to analyze determinants of the incidence of two types of industrial actions: strikes and work bans. Work bans are actions where workers refuse to engage in certain specified tasks such as overtime but otherwise remain on the job. Evidence is found that the incidence of work bans is affected by changes in economic and institutional conditions in significantly different ways than strikes.

A LARGE BODY OF THEORETICAL and empirical research has sought to identify the determinants of industrial disputes, but most research has focused on only one form of dispute—the strike. Although strikes are the most direct and most visibly disruptive type of action in which workers can engage, other types of collective but nonstrike action also can be used by workers against their employers. When a dispute arises at a workplace, workers may decide that their best response is to remain on the job but impose some type of restriction on how their work will be carried out. For example, in the United States, workers who fail to

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reach agreement with their firm on a new labor contract may continue to work specifically to the terms of the expired contract, which may lead to productive inefficiency caused by a breakdown in cooperation (Cramton and Tracy, 1994). In Australia and Britain, nonstrike action can involve more explicit tactics—workers may refuse to engage in certain specified tasks, such as working overtime, performing maintenance, or handling deliveries, but otherwise remain on the job. Workplace surveys in Australia (see Callus et al., 1991) and Britain (see Milner, 1993) indicate that in some industries, these actions—which are collectively referred to as *work bans*—have affected as many workplaces as strikes. The main distinction between work bans and strikes is that although the union's actions can still result in costly disruptions to production, workers continue to work in their jobs and continue to be paid their regular wages.

When alternative forms of action to strikes are available, the question arises as to what affects the incidence of these types of action. Specifically, are the determinants of nonstrike action the same as the determinants of strikes? The type of action that occurs will have important implications for both the actual costs incurred by the workers and firm once the action commences and the effects on the consumers of the firm's output. By analyzing the incidence of strikes and bans together, the determinants of the different dispute types can be contrasted directly, which in turn yields useful insights into the impact of changing economic and institutional conditions on industrial action. Unless changing economic or institutional factors affect the incidence of strike and nonstrike actions similarly, it may be misleading to use strike measures to gauge the impact on industrial action of such changes. This is particularly relevant in the Australian case because it has been found that the introduction of the prices and incomes Accord in 1983 reduced the incidence of strike action (Beggs and Chapman, 1987; Kennan and Wilson, 1994).

There has been only limited analysis of the incidence of nonstrike forms of industrial action in the literature. For example, Blanchflower and Cubbin (1986) estimate the determinants of both strike incidence and dispute incidence in British workplaces, where disputes include both strike and nonstrike forms of action such as overtime bans. Milner (1994), using data on a sample of wage settlements in Britain, identifies three factors that affect workers' choice whether to go on strike or to ban overtime: the feasibility of a ban, the capacity to organize one, and the intended effect of the action. In a related vein, Cramton and Tracy (1994) derive and test a bargaining model of union contract negotiations in which the union decides between a strike and a holdout. Cramton and Tracy's model predicts that the relative incidence of strikes and holdouts will be affected by

changes in the costs of each type of action to the union and by changes in the degree of disruption to production caused by each type of action. For Australia, Dawkins and Wooden (1993) estimate the incidence of strikes and bans separately using the 1991 Australian Workplace Industrial Relations Survey.

The purpose of this article is to contribute to this literature by using a recently developed dispute-level data set of strike and nonstrike actions in Australian manufacturing to analyze the determinants of the incidence of different types of disputes. The analysis involves two distinct empirical approaches that will address the issues in different but complementary ways. First, the absolute incidence (or frequency) of strikes and work bans at a sample of large manufacturing firms is analyzed separately for each type of dispute, using a firm-level panel data set. Second, the relative incidence (or composition) of industrial disputes is analyzed using a *dispute-level data set* that allows dispute-specific variables to be included as regressors. *Absolute incidence* measures the number of disputes occurring at a firm, whereas *relative incidence* measures the probability of a particular type of action occurring given that a dispute has arisen.

The article is structured as follows. The second section presents a brief overview of the Australian institutional framework and then defines the main types of industrial action used by Australian workers within this context. In the third section, data sources are described, and the construction of the relevant data sets is outlined. In the fourth section, a simple empirical framework is outlined that identifies potential determinants of the incidence of different types of disputes. In the fifth section, the determinants of strike and ban incidence are analyzed, and the consistency of results between the two approaches is compared. Conclusions and directions for future research are outlined in the last section.

Australian Institutional Setting and Industrial Disputes

Industrial relations in Australia until recently have been characterized by a relatively centralized system of wage determination in which the terms and conditions of employment for most workers were contained in a series of national and industry-level awards.[1] Awards were of indefinite duration, and employers or unions who were respondent to a particular award could seek changes to the terms of the award at any time. Changes to awards occurred under the auspices of the Industrial Relations

[1] Awards typically specified wage rates, hours of work, annual leave, and other job conditions and applied to the employees of single employers or multiple employers within industries or across industries.

Commission (IRC) and followed negotiation between the relevant unions and employer groups and/or arbitration by the IRC. However, since many awards specified only the minimum employment conditions to be met, wages, benefits, and conditions could be improved at the firm level by the negotiation of "over-award" payments or conditions between employers and employees. As well, firm-level negotiations also occurred over conditions not specified in the relevant award.

Within the award system, the degree of centralized wage determination has varied considerably over time. The year 1983 marked the introduction of the Prices and Incomes Accord, in which Australian unions agreed to make no further claims against employers to vary award conditions in exchange for full indexation to the consumer price index (CPI) of the wages of all workers under awards. As a result of worsening economic conditions in 1986, full indexation was replaced by a two-tiered system in 1987 in which workers received a flat rate wage increase, with a second component that had to be negotiated at the level of a particular award and justified in terms of improved productivity. Subsequent changes to the Accord continued to emphasize decentralized negotiations, with a shift to enterprise-based bargaining beginning in 1991.[2] Due to data limitations, the period of analysis in this study is limited to 1983–1992, which coincides with the Accord period.

An important implication of the role of the IRC for the empirical analysis is that Australian industrial relations were characterized by a relatively high incidence of short "protest" strikes that typically lasted no more than a single day and involved a return to work without negotiation [see Dabscheck (1992) for an overview]. Protest strikes were used by the union not to obtain short-term concessions but rather as signaling devices to demonstrate the seriousness of the conflict, to notify the IRC that a grievance had arisen, and to speed up resolution of the grievances through IRC hearings. Since protest strikes are likely to arise in circumstances different from more conventional indefinite-duration strikes, it is necessary to distinguish between strikes and protests in the dispute data. Further, thorough analysis of protest incidence requires explicit consideration of the operation of the Australian arbitration system and is beyond the scope of this article. Therefore, the approach adopted is to control explicitly for protest strikes in the empirical analysis but restrict discussion to strikes and work bans.

[2] The Accord was formally ended in 1996 with the election of the coalition government. Since then, the system has increasingly focused on decentralized enterprise-based bargaining and paring back of the powers of the IRC. For more detailed discussion of the phases of the Accord, see Dabscheck (1995).

Protests cannot be distinguished directly from other strikes in the data, so it is necessary to infer the nature of the strike from its duration and terms of settlement. Strikes in the data that are of at most 1 day's duration and where no negotiation or third-party involvement was reported as having occurred prior to the return to work are assumed to be protests.[3]

Data and Descriptive Statistics

The main obstacle to the analysis of nonstrike industrial action in Australia has been the paucity of data on actions other than strikes. The official statistical organization in Australia, the Australian Bureau of Statistics, collects data only on strikes (including employer-initiated lockouts). The Australian Workplace Industrial Relations Survey, or AWIRS (see Callus et al., 1991), contains data on whether or not nonstrike action occurred at particular workplaces during the survey year but not on the frequency of industrial action or on the characteristics of that action. Since industrial action tends to be concentrated in a relatively small number of firms, this is a serious limitation to the AWIRS data.[4]

The data for this analysis are drawn from a dispute-level database of strike and nonstrike industrial actions compiled by the author from reports published by the Australian Department of Industrial Relations (DIR). Since 1974, the DIR has published dispute-level data on industrial actions in a series of weekly (monthly from 1988) reports entitled *Report on Industrial Disputes*. Each report contains detailed information on specific industrial disputes that commenced or were ongoing in the week or month of the report and includes information on both strike and nonstrike disputes. For each dispute, data are available on the type(s) of action that occurred, the industry subgroup, the names of the union(s) involved, the start and end dates, the reported cause(s), and the name of the firm involved.[5] From the reports, a database of 4499 strikes and work bans has been compiled that represents all disputes recorded by the DIR

[3] The sensitivity of the results to this definition can be tested by increasing the cutoff point. However, given the reasons for why protests occur, it would seem unlikely that a protest would last much longer than a single day.

[4] For example, AWIRS reports that only 4 percent of workplaces experienced industrial action during the survey year, while the dispute data suggest that a relatively small number of firms experience a large proportion of that action.

[5] There is no consistency in the level of aggregation at which firm information is reported in the reports. This ranges from particular workshops or plants, to subsidiary companies, to corporate parent companies.

as occurring in Australian manufacturing industries over the period 1983–1992.[6] Of these disputes, 2196 are classified as strikes and 895 as bans, whereas the remainder are classified as protests.

The nature of the dispute data necessitates using separate econometric approaches to study dispute incidence. Since fixed-term labor agreements were rare in Australia, there is no counterpart to the "end of contract" negotiations prevalent in the United States in which the probability of action occurring can be estimated. Grievances (and so industrial disputes) between workers and employers could arise at any time, but no information is available on grievances that did not involve any form of action nor on when such grievances arose. Thus it is necessary to aggregate across disputes in some way in order to study absolute incidence. However, the incidence of work bans conditional on some action occurring can be analyzed directly using the dispute database simply by modeling the probability of a work ban occurring given a dispute.

In order to measure absolute incidence, a quarterly firm-level panel data set of dispute frequency is compiled as follows: First, because of the variation in how *firm* is reported, an index of Australian parent and subsidiary companies published by IBIS Research is used to identify the parent company experiencing each dispute.[7] The parent companies associated with 3619 of the disputes could be identified.[8] Second, a subset of firms is selected by identifying all manufacturing firms in the IBIS database that were in operation over the whole sample period. This yielded a total of 203 firms, of which 85 experienced no industrial action at all over the period. As discussed in the Appendix, the scope of IBIS data collection expanded considerably over time, so a balanced panel is selected to offset sample selection bias.[9] Then, for each firm, the number of disputes commencing in each quarter of the sample period is computed to yield a quarterly measure of dispute frequency. The end result is a balanced panel of 203 firms over 40 quarters that encompasses a total of 2800 strikes and bans.

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[6] While reports were published up to 1994, preliminary investigation of reports data for 1993 suggested a decline in the correlation of the aggregated strike data with published ABS statistics, reflecting a shift in emphasis of the DIR away from monitoring and toward program delivery. The DIR suspended data collection in 1995. Discussion of the reliability of the DIR data is contained in the Appendix. It also was not possible to obtain access to the reports prior to 1983.

[7] As is discussed later, the IBIS database is limited to larger Australian companies, although the scope of collection has varied significantly over time. Additional details are contained in the Appendix.

[8] The remainder included disputes for which no firm was recorded in the reports, multiple firm disputes for which firms were not listed, government departments, and smaller firms not contained in the IBIS databases.

[9] This raises other selection issues that are discussed later in the article.

Two issues should be noted: First, sample selection is clearly an issue because the selected firms are large Australian manufacturing firms that have operated over the entire period. Thus the determinants of industrial action identified may not generalize to all manufacturing firms, particularly smaller firms, and should be seen as indicative rather than comprehensive. Second, no quarterly firm-specific information is available aside from the firms' experiences with industrial action contained within the dispute database and the relevant industry group(s) in which the firms are engaged in business. However, it is possible to use the dispute-specific data (e.g., on union involvement) to develop industry-level proxies that can then be linked to all firms in the same industry group whether or not they actually experienced any industrial action.

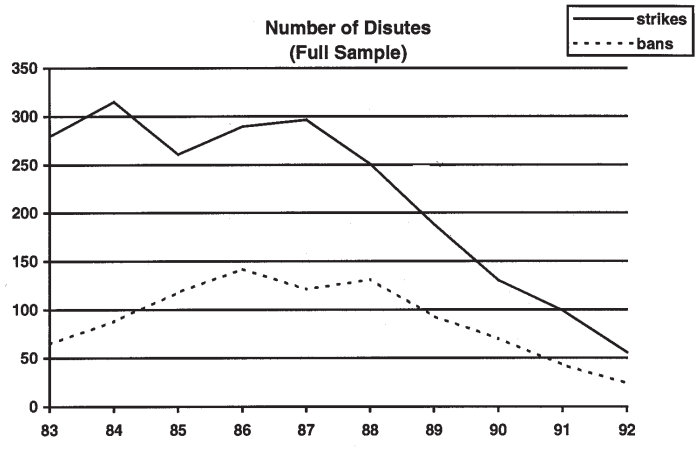
The second phase of the empirical work focuses on the probability that a particular type of action occurs given that a dispute has arisen [Cramton and Tracy (1994) refer to this as the "composition" of disputes]. The frame of reference is the dispute rather than the firm, so dispute-specific information such as dispute size and multiple union involvement can be included directly as regressors. Analyzing relative incidence provides additional insights into dispute incidence and complements the analysis of dispute frequency. For example, even if changes in a variable are identified as increasing the absolute incidence of both strikes and bans, it may be that one type of action also becomes relatively more likely to occur as a result of that change.

In Figure 1, the numbers of strikes and bans are plotted for each year of the sample period. The first aspect of the diagram to note is that strikes are more common than work bans over the whole period. Second, two distinct phases in the incidence of disputes over the period are apparent. Up to 1986–1987, the number of bans increases, whereas the incidence of other strikes shows no clear trend. Thus there appears to be preliminary support for Chapman and Gruen's (1991) conjecture that focusing only on strikes has led to an overstatement of the decline in the incidence of industrial action experienced in Australia through the 1980s, at least to 1986.[10] After 1987, however, the incidence of both strikes and bans declines steadily so that by 1992 the numbers of each type of dispute are lower than during any previous year of the sample.[11]

[10] Although not included in the diagram, the incidence of protests is also greater than for work bans and shows a downward trend over the whole sample period. The sensitivity of the results to the treatment of protests will be examined later in this article.

[11] Aggregate strike statistics published by the Australian Bureau of Statistics show that strike incidence has continued to decline, even through the economic recovery following the 1991–1992 recession. Explaining the secular downward trend in strike incidence since the mid-1980s is an interesting issue for further research.

FIGURE 1



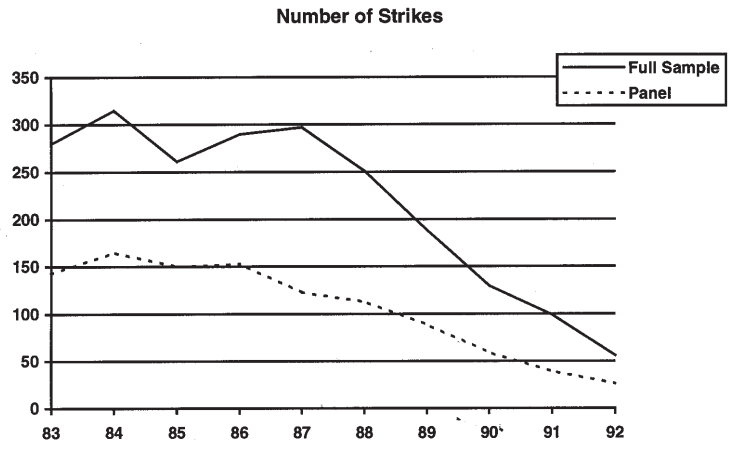
Since the analysis of dispute frequency is based on a subset of the full sample of disputes, it is important to determine the consistency of trends over time in the two series. Figure 2 illustrates the number of strikes for both the full sample and the strikes occurring in the balanced panel of firms. (Trends in the incidence of bans are very similar and so are not reported.) Trends in the two strike series are broadly consistent, with no obvious trend up to 1986 in the panel series, followed by a steady decline in strike incidence to 1992. The distribution of strikes across two-digit industry groups in the subsample is also broadly consistent with the full sample of strikes.[12]

Determinants of the Incidence of Industrial Action

The type of industrial action that occurs during a dispute will affect both the costs incurred by the workers from engaging in industrial action and the payoffs to the workers in terms of concessions from the employer that result from the action. The magnitudes of these expected payoffs and costs are likely to be determined by both the economic and institutional conditions prevailing when a dispute arises, and so changes in these conditions may affect the incidence of different types of disputes. This section will identify potential determinants of the incidence of strikes and bans and indicate expected directions of effect. In many cases, a variety of

[12] Using the subsample of disputes to analyze relative incidence could be problematic, however, because it appears that most of the disputes excluded from the full sample of disputes are strikes.

FIGURE 2



alternative hypotheses are equally likely so that the predicted effect is often undetermined. Where there are *a priori* reasons to expect particular variables to affect the incidence of strikes and bans in different ways, these differences will be highlighted. It should be reiterated that since the underlying data are dispute-level rather than firm-level, there is no information available on the characteristics of the firms experiencing the action. This necessitates the use of dispute-specific or industry-level variables as regressors to proxy for unobserved firm-specific characteristics.

Expected costs of industrial action. The main cost to workers from industrial action is the loss of some proportion of earnings. Since regular earnings are lost to workers on strike but not workers in a ban, higher wages may be associated with lower strike incidence but may have no effect on ban incidence.[13] However, since overtime earnings would be forfeited during an overtime ban as well as during a strike, and since bans on overtime constitute a large proportion of work bans, the incidence of both strikes and bans may be reduced by increases in overtime availability. Alternatively, higher overtime levels may be associated with an increased incidence of bans if overtime proxies for the "feasibility" of implementing overtime bans (Milner, 1994). That is, when overtime is low, there may be little point in banning overtime work.[14] Beggs and

[13] In contrast, higher wages also may proxy for worker capacity to withstand disruptions to earnings and so lead to greater strike incidence.

[14] Further, when overtime is more plentiful, it may be easier for workers to recoup lost earnings by working more overtime when the dispute ends, which may increase dispute incidence.

Chapman (1987) analyze aggregate strike activity in Australia and find a positive relationship between overtime and strikes, although their composite measure of strike activity reflects both dispute frequency and dispute size. Quarterly data on average earnings and average overtime hours at the two-digit industry level are included as regressors to reflect explicit worker costs from industrial action.

One source of costs to the workers from work bans but not strikes is that the employer may escalate the dispute by temporarily laying off the workers involved and increasing the costs of the dispute to the workers. Thus one determinant of the potential costs of a work ban is the probability that workers will be laid off during the course of the ban. If the employer has demonstrated a willingness to lay off workers, then the probability that workers will be laid off during the current ban may be higher. Therefore, layoffs during the course of past disputes may reduce the incidence of work bans. The probability of layoff is proxied in two ways. First, a dummy variable is defined that takes the value 1 if a layoff occurred during the course of a dispute at the firm in the 6 months prior to either the current quarter or the current dispute. Second, the number of dispute-related layoffs occurring at the two-digit industry level during the previous 6 months is also computed to reflect differences across industries in the incidence of dispute-related layoffs.

A third source of potential costs to workers arising from industrial action is that employers can initiate legal proceedings to impose sanctions (cancellation of award conditions, ineligibility for future award adjustments, or financial damages) against the union representing the workers involved. Although legal action against unions rarely occurs in practice in Australia (see Hamilton, 1991), where previous industrial action has resulted in either the threat or commencement of legal proceedings against the union, the expected costs to the workers of the union from future industrial action may be higher. Since the disruption to production arising from a strike is likely to be more apparent, easier to quantify, and so more easily incorporated into legal proceedings, an increased threat of legal proceedings may decrease the incidence of strikes more than bans.

For relative incidence, this effect is proxied for by a dummy variable that takes the value 1 if legal sanctions had been threatened or imposed against the union involved in the current dispute in the same state within 6 months of the current dispute arising. For dispute frequency at the firm level, the problem is complicated by the fact that the unions present at each firm are not known, so industry average data based on union involvement in disputes must be used. First, the number of disputes

involving sanctions are determined for each major union in manufacturing for each quarter of the sample. Then, an industry-specific measure of sanction incidence is calculated that is the weighted average number of sanctions by the union in the industry, where the weights reflect the proportion of disputes in the industry involving the union.

The four-firm industry concentration ratio is another potential determinant of workers' costs. If a firm has a degree of monopoly power (as proxied by a high industry concentration ratio), workers will be aware that the firm is better able to withstand any disruption to production arising from industrial action because fewer competitors exist to fill supply gaps. Thus workers may commence fewer disputes because a longer, costlier dispute may be anticipated. Of course, higher concentration also may indicate the presence of economic rents, and workers may use industrial action to support a redistribution of these rents to themselves. Tracy (1987) finds that higher concentration ratios are associated with a higher strike incidence at U.S. firms.

Finally, labor market slackness, as measured by the unemployment rate, may be another determinant of dispute costs if they reflect lower employment security and so a greater reluctance by workers to engage in industrial action. Vroman (1989) finds an inverse relationship between the unemployment rate and strike incidence using U.S. data.[15]

The effectiveness of industrial action. Factors that reflect the effectiveness of industrial action also should affect dispute incidence, since the concessions the workers would expect to gain from the firm are larger when the disruption to production is greater. From the workers' perspective, the effectiveness of an action will be reflected by the disruption the action causes to production at the firm. Thus the more disruptive a particular action is likely to be to production, the more likely the workers may be to initiate that type of action.

First, disruption to production may be more costly when aggregate demand is strong; the magnitude of lost sales may be larger, and the firm's customers may be more likely to turn to alternative suppliers to avoid interruptions to their own production. The magnitude of lost sales is likely to depend on the nature of the firm's production; for example, perishable goods cannot be stockpiled to meet demand when a dispute

[15] The unemployment rate also may reflect the ease with which striking workers can obtain alternative employment during the course of the strike. This is not likely to be relevant for Australian workers because more than 80 percent of strikes in Australian manufacturing last less than 10 days (McDonald, 1995) and opportunities for workers to find alternative short-term employment are limited.

occurs. However, disputes will still be costly even if output can be stockpiled; for example, industrial action may force equipment shutdown that will be more costly when demand is strong. Although Australian time-series studies have not examined the cyclicality of strike incidence in detail, Kennan and Wilson (1989) report that strike incidence in the United States and Canada is generally found to be procyclical. To measure cyclicality, the rate of change of gross product by industry is included as a regressor.

Variables reflecting union presence and activity also may be important. Frenkel (1980:149) reports that when the workforce may not be committed to using industrial action, union organizers may engage in work bans because the implementation of work bans usually will require only key groups of loyal union members. Thus, if lower union density is a proxy for the average worker's level of commitment to the use of industrial action, lower density should be associated with a higher relative incidence of work bans. In contrast, as suggested by Frenkel (1980:148) and Edwards (1983), nonstrike industrial action by its nature may be more difficult to organize and sustain and so may require a higher level of workplace organization than strike action. Insofar as union density will be correlated with union workplace organization, higher union density may instead be associated with a lower incidence of bans. These effects also may be obscured by the fact that union representation is crucial to successful industrial action, so union density may be positively correlated with industrial action generally.

Where negotiations tend to involve multiple unions (e.g., because of combined union committees), disputes may be more likely to occur because the resolution of grievances involving multiple unions may be more difficult. At the same time, sustaining industrial action across multiple unions also may be more difficult because of conflicting interests among the unions arising during the dispute. Multiple unionism is found to be positively correlated with strike incidence in some U.K. studies (e.g., Blanchflower and Cubbin, 1986). Although union representation by firm is not observed, an admittedly rough proxy is based on the proportion of past disputes at each firm (or at the industry level) that involved multiple unions. For the analysis of relative incidence, two measures of multiple union activity are tested. First, a dummy variable is defined that takes the value 1 if there are multiple unions involved in the current dispute. Second, for each union, the proportion of past disputes involving that union that were multiple-union disputes is computed and then averaged across the unions involved in each dispute.

For strikes, an important determinant of the magnitude of the disruption will be the firm's capacity to maintain production at the affected areas when a strike occurs. This does not apply to bans; opportunities for the firm to offset production losses during a ban are limited by the fact that workers on a ban remain on the job and can ensure that the ban is maintained. As well, the continued presence of the workers on site would prevent the firm from deploying other workers to circumvent the ban. Workplace size may reflect the magnitude of disruption, but the direction of effect is uncertain. *Ceteris paribus*, larger workplaces may have greater scope to bring in staff from other areas of the workplace, which might reduce strike incidence[16]; however, to the extent that larger workplaces have more complex employer-employee relationships, disputes generally may be more likely to occur. Empirical analyses of strike incidence often report a positive relationship between strike incidence and workplace size, including Dawkins and Wooden (1993) for Australia. A related variable that may reflect the degree of disruption caused by the dispute more precisely is the ratio of dispute size to establishment size. The greater the proportion of the affected workplace that is directly affected by a dispute, the more disruptive the dispute is likely to be. Since workplace size is unobserved, it is proxied by average establishment size at the two-digit industry level.[17]

The capital intensity of production also may be a potential determinant of the degree of disruption to production arising from a dispute. In industries where production is more capital-intensive, staff employees or management would be able to step in and maintain a greater proportion of production (i.e., operate the machines) when workers strike, compared with production processes that are more labor-intensive (see Cramton and Tracy, 1994), thus making strikes less effective. However, bans may be less effective in highly capitalized workplaces if production is on a 24-hour basis and there is less need for overtime in the first place.

The Prices and Incomes Accord. The period 1983–1992 was characterized by considerable institutional changes in Australia, and it is of interest to determine the effect that these changes have had on the

[16] However, given the short duration of most strikes in Australia, opportunities for the firm to transfer resources to maintain production are probably limited.

[17] An *establishment* refers to a particular physical location or plant at which manufacturing takes place. Industry establishment-level employment data are used rather than enterprise-level data because the majority of disputes in the database occur at a single location. Also, the variation in establishment size within industries should be lower than for enterprise size because the latter will encompass both single-plant enterprises and large multiplant enterprises.

incidence of different types of disputes. There are two main issues for investigation: the effects on dispute tactics after the introduction of the Accord in 1983 and the effects on worker dispute tactics of the reintroduction of decentralized bargaining in 1987. Chapman and Gruen (1991) suggest that dispute tactics might be expected to shift from strikes to work bans as workers attempt to obtain additional concessions from employers without being seen to act outside the spirit of the Accord, which would jeopardize their access to the indexed wage increases. Charles (1986) also suggests that since semiautomatic wage adjustments may weaken the rationale for unions in the eyes of prospective or existing members, unions may become more active in nonaward issues such as occupational health and safety or the introduction of new technology. Where the payoffs to workers may be less well defined compared with disputes over wages or hours, nonstrike industrial action may be favored. Although the contemporaneous impact of the introduction of the Accord cannot be determined, the effect of lagged or gradual adjustment can be estimated.

The reintroduction of more decentralized negotiations over the terms and conditions of employment would be expected to counteract these effects. From 1987, workers were no longer constrained by a commitment to make no extra claims; in fact, decentralized negotiations at the industry or firm level were required if improvements to employment terms and conditions were to be obtained. Thus the disincentive to using strike action in the course of negotiations was effectively removed.

To approximate the impact of the changing institutional framework, a quarterly time trend is included in the specification along with separate shift and trend terms for the 1987–1992 period. Shift terms will capture the instantaneous effect of the institutional change, whereas trend terms will allow gradual adjustment as workers adapt to the new conditions.

Econometric Methods and Results

Frequency. Since most firms in the sample experience at most a small number of disputes in any quarter and a number of firms experience no disputes at all, estimation by OLS is inappropriate because the dispute data for each firm cannot be assumed to follow a continuous distribution. Instead, the method adopted is to assume that the number of disputes occurring at a firm in any period is determined according to a Poisson distribution that explicitly accounts for the discrete nature of the data. From Green (1993:677), the primary equation of the model is

$$\text{Prob}(Y_i = y_i) = \frac{e^{-\lambda i}\lambda_i^{yi}}{y_i!} \quad yi = 0,1,2,\ldots \tag{1}$$

where y_i is the number of disputes occurring at a firm in a particular quarter. Assuming

$$\ln \lambda_i = \beta' x_i \tag{2}$$

the likelihood function can be written as

$$\ln L = \sum_i \left(-\lambda_i + y_i \beta' x_i - \ln y_i!\right) \tag{3}$$

Owing to the panel nature of the data, Equation (3) can be expanded to allow for firm-specific effects; this is likely to be particularly important in the current context given the lack of firm-specific regressors. The estimating equation employed is an adaptation of Equation (3) that incorporates firm-specific random effects and is based on a program written by Hall (1995). The model is estimated separately for strikes and bans, and estimation results are contained in Table 1. To allow for persistence in the incidence of industrial action by firm, the number of disputes at the firm during the previous four quarters is included as an additional regressor. Also, a dummy variable is included for disputes in basic metal manufacturing to reflect characteristics of industry structure and industrial relations unique to that industry.[18]

From Table 1 it can be seen that there are substantial differences between the determinants of strike incidence and the determinants of ban incidence. (The superscript *a* indicates that the coefficient was extremely poorly determined—*t* statistic less than 0.5—and so the specification was reestimated omitting that variable.) A higher capital-labor ratio, higher incidence of past layoffs (measured at the two-digit industry level), and higher union density all lead to a significantly lower incidence of work bans but not strikes, whereas improved demand conditions and greater

[18] Interindustry comparisons indicate that more than twice as many disputes occurred in basic metal manufacturing than occurred in the next most dispute-prone industry, but less than 7 percent of these disputes were work bans, compared with 18 percent in the next least ban-prone industry [see McDonald (1995) for further details].

TABLE 1

DETERMINANTS OF THE INCIDENCE OF STRIKES AND BANS

	Strikes		Bans	
Variable	Coefficient	*t* Statistic	Coefficient	*t* Statistic
Layoffs	[a]		–0.0605*	–1.80
Multiple unions	0.4446**	3.24	0.2487	1.40
Legal Sanctions	[a]		–2.01	–1.00
Wages	[a]		[a]	
Gross product	0.0142**	2.51	[a]	
Overtime	–0.2495*	–1.81	–0.7508**	–5.25[b]
Capital-labor	0.0135	0.970	–0.0547**	–2.29[b]
Unemployment	–0.0958**	–2.39	–0.1682**	–4.08
Workplace size	–0.0185**	–2.30	0.0792**	2.81[b]
Workplace size	[a]		–0.0006**	–3.37
Union density	3.224	1.48	–7.836**	–2.65[b]
Concentration	3.470*	1.78	7.141**	3.63
Time trend	[a]		0.0734**	2.42
Accord II	1.171**	4.24	1.968**	4.76
Accord II* time trend	–0.0670**	–5.99	–0.1269**	–4.38[b]
Previous disputes	0.0077**	5.79	–0.0028	–1.05[b]
Basic metal industry	1.491**	2.83	0.7613	1.18
DELTA (random effects)	0.3203**	7.55	0.2960**	6.63
LR test (zero slopes)	370.0**		247.7**	

[a]The *t* stat of the associated coefficient estimate is less than 0.5 in earlier estimations, so the variable is omitted from the final estimated specification that is reported in the table.

[b]For variables included in the final regressions for both strikes and bans, the difference between the estimated coefficient for strikes is significantly different from the estimated coefficient for bans at the 5 % level.

*Significant at the 10 % level.

**Significant at the 5 % level.

probability of multiple union involvement in the dispute increase the incidence of strikes but not bans. Workplace size has a significant but nonlinear impact on the incidence of work bans (a negative relationship for establishments larger than 66 workers) and a significant negative impact on the incidence of strikes.

A number of regressors are found to affect both strike incidence and ban incidence in the same direction. Disputes of both types are more likely in concentrated industries, possibly indicating the existence of economic rents. As expected, a higher unemployment rate reduces the incidence of both types of actions. Higher overtime incidence is also associated with declines in the incidence of both strikes and bans. The coefficient on overtime in the bans equation is particularly strongly determined, providing support for the contention that workers are less likely to impose work bans when the costs of doing so are higher. However, wages are found to have no significant impact on the incidence of either strikes or bans. Also, there is significant persistence in strike action at the firm level

even after allowing for unobserved firm-specific effects, but there is no persistence in ban action.[19]

Of particular interest is the Accord variables and interactions with the time trend. For strikes, there is no trend in strike incidence up to 1987, which implies that the introduction of the Accord had only possibly a contemporaneous impact on strike incidence (and so unobserved over the current sample period). However, consistent with Figure 1, there was a secular decline in strike incidence after 1986 that was not due to changing economic conditions. This is in contrast to what might be expected with the abandonment of the no extra claims provisions of the first phases of the Accord if greater workplace bargaining leads to greater disputation. The incidence of work bans shows a significant upward trend to 1986, which is consistent with the hypothesis that there was an increasing use of nonstrike action as workers adjusted to the Accord. After 1986, however, the incidence of work bans falls along with strike incidence. It may be that the shift to enterprise-based bargaining led to more effective workplace resolution of grievances. Alternatively, the period from 1987 also coincided with efforts by employer groups to reassert managerial prerogative and challenge the power of the unions both through confrontation (notable test cases included Dollar Sweets, Mujinberri Meat Works, the commercial air pilots dispute, and Robe River) and through the IRC (e.g., challenges to closed-shop agreements). This in turn led to an industrial relations environment in which workers were more reluctant to use any form of collective action [see Dabsheck (1995) for further discussion]. Gauging the impact of these changes presents an interesting avenue for further work.[20]

Relative incidence. Phase 2 involves the estimation of a discrete choice logit model where the dependent variable takes a value 1 if the dispute involved a work ban and 0 if the dispute involved a strike. A positive coefficient indicates that an increase in the associated variable implies that a work ban is relatively more likely to occur than a strike, conditional on some action occurring. Two possible approaches to account for protests in the dispute data are either to omit them from the data and estimate a binary choice model or to estimate a multinomial

[19] Without firm-specific random effects, the firm-specific layoff variable is positive and significant for both strikes and bans. However, once random effects are included, the variable becomes highly insignificant in both equations and so is omitted from the estimation.

[20] The empirical results on the Accord variables are consistent with Morris and Wilson (1994), who analyzed aggregate trends in Australian strike incidence over the period 1959–1991. They find that separate intercept terms included for the Accord phases 1983–1986 and 1987–1991 are both negative and significant but that the magnitude of the latter was larger than the magnitude of the former.

logit model where protests are an alternative outcome to strikes and bans. Econometric results are contained in Table 2 and are based on the latter approach. (Coefficient estimates for protests are not reported but are available on request.)

From Table 2 it can be seen that there are significant differences in the determinants of strikes and work bans. Further, there is a fair degree of consistency between the results in Table 2 and the results in Table 1 even though both the dependent variable and econometric methodology are substantially different. Work bans are relatively less likely to occur than strikes when workers have been laid off during the course of previous disputes and when union density is lower. Overtime incidence and the unemployment rate—two variables that were found to affect strike and ban frequency similarly—also have no significant effect on the relative incidence of work bans. Also, while an increase in the concentration rate increased the frequency of both types of action, it also increases the incidence of work bans relative to strikes. It may be that if workers expect longer disputes arising from the relatively more secure market position of the firm, then they may opt for relatively less costly forms of industrial action.

The impact of the Accord variables on relative incidence is also comparable with changes in absolute incidence over the period. There is an increasing trend in the relative incidence of work bans between 1983 and

TABLE 2

RESULTS FROM LOGIT ESTIMATION

Variable	Coefficient	*t* Statistic	*dp*/*dx*
Layoffs	–0.9042**	–2.96	–0.133
Multiple unions	0.6016**	4.30	0.066
Legal sanctions	0.4964**	3.29	0.091
Wages	0.1126*	1.84	0.010
Gross product	–0.0089	–1.44	–0.001
Overtime	–0.0209	–0.223	0.005
Capital-labor ratio	0.0032	1.39	0.001
Unemployment rate	–0.0125	–0.414	–0.004
Establishment size	–0.0043**	–2.56	–0.001
Union density	–1.378**	–2.01	–0.342
Concentration ratio	1.790**	3.12	0.292
Dispute size/est. size	–0.0085	–1.40	–0.002
Time trend	0.0663**	4.46	0.009
Accord II	0.8221**	2.49	0.134
Accord II* time trend	–0.0713**	–3.89	–0.011
Basic metal manuf.	–1.700**	–5.55	–0.291
Log likelihood	–3988.83		
Pseudo-R^2	0.146		
LR test of zero coef.	1360.6		

NOTE: $dp/dx > 0$ indicates an increase in x increases the probability of a ban occurring relative to a strike.
*Significant at the 10 % level.
**Significant at the 5 % level.

1986 but not between 1987 and 1992. (The sum of the coefficients on the trend terms is negative but not significantly different from zero.) The results indicate that after controlling for changing economic conditions, workers tended to rely increasingly on work bans over the period of full wage indexation. However, coinciding with the reintroduction of more decentralized wage determination, the positive trend in the relative incidence of work bans is reduced to zero. The significance of the constant term for the 1987–1992 period simply indicates that the relative incidence of work bans from 1987 remains higher than in 1983, although there is no longer a tendency for the relative incidence of bans to increase.

Other variables are significant determinants of relative incidence but not frequency. Past threatened or actual legal sanctions significantly increase the probability of a ban occurring relative to a strike, possibly indicating union reluctance to engage in more direct forms of industrial action. Also, an increase in wages also raises the relative incidence of work bans, although the coefficient is only weakly significant. This also accords with expectations, since bans may be relatively more likely to occur than strikes when associated strike costs are higher. Neither gross product nor the capital-labor ratio is found to affect relative incidence.

Average establishment size is negatively related to the relative incidence of work bans, indicating that larger workplaces are relatively more likely to experience strikes than bans when disputes occur. It may be relatively harder to coordinate and/or maintain work bans at larger workplaces, leading to a greater reliance on strike action.[21]

Inconsistent results across the sets of results are obtained for only one variable—multiple-union involvement in disputes. Multiple-union involvement is found to increase the relative incidence of work bans as well as the frequency of strikes. Multiple unionism is measured as the proportion of past disputes involving multiple unions; if a dummy variable indicating multiple-union involvement in the current dispute is used instead, a positive coefficient is obtained, although the estimate is not significantly different from zero.[22]

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[21] If larger firms tend to have larger workplaces, this may explain Dawkins and Wooden's (1993) positive relationship between size and strike incidence. Within the subset of large firms where industrial action is most likely to occur, the relationship appears to be negative.

[22] To determine the sensitivity of the results to the treatment of protests in the dispute data, binomial logit and probit models were estimated on the subsample of strikes and bans after omitting protests. In both cases, the results were qualitatively unchanged from those reported in Table 2, except that the coefficient on the wages variable was no longer significantly different from zero.

State, union, and cause variables. Since a variety of information is available on the characteristics of particular disputes, the robustness of results in Table 2 can be examined by including these variables as additional regressors in the basic specification. The importance of three main sets of variables is investigated: variables for dispute cause, for union(s) involved, and for region. For each, a set of dummy variables is defined and included in the estimation.

To summarize the main results, cause, union, and region dummy variables are all found to be significant determinants of the type of action that occurs when a dispute arises, although coefficient estimates from Table 2 are qualitatively unchanged except where noted. Disputes over safety and worker dismissals are less likely to involve work bans than strikes, perhaps not surprisingly given that the nature of these grievances would require immediate pressure be brought to bear on the employer. Disputes involving occupational-based unions such as the Electrical Trades Union are relatively more likely to involve work bans; because occupational unions such as the ETU tend to have a membership that is dispersed across many firms, the proportion of such workers at a particular workplace is small. Thus the effectiveness of a strike may be limited.[23] Including a set of union dummy variables reduces the coefficient on union density to insignificance, but other variables are largely unaffected. Finally, disputes in Victoria and South Australia are relatively more likely to involve work bans than strikes, even after controlling for differences in industrial structure across states. This may reflect differences in state institutional structures, such as differences in the various state arbitration tribunals or differences in state-based awards. Again, the main results in Table 2 are generally unaffected by the inclusion of the state dummy variables. Similar results are obtained when all three additional sets of variables are included.

Conclusion

The majority of research into the determinants of industrial action has focused on strikes and has tended to ignore the fact that workers and unions can and do engage in other forms of action. An important result from this analysis is that it is incorrect to assume that the determinants of these actions are the same as those for strikes. Consistent with previous research, the analysis demonstrates that changing economic conditions

[23] This need not always be the case: Small groups of workers who perform key tasks in the production process will have significant bargaining power.

and changing institutions are found to affect the incidence of strikes and nonstrike actions in substantially different ways. While some factors, such as aggregate labor market conditions, affect the incidence of strikes and bans in the same direction, other factors, such as the probability of layoffs and union density, have significantly different effects. Changing Australian labor market institutions also have affected strike and ban incidence differently; the first Accord period between 1983 and 1987 coincided with a significant increase in both the absolute and relative incidence of nonstrike actions.

Thus nonstrike action is likely to require a separate empirical (and, by implication, theoretical) analysis. Unless economic or institutional changes are found to affect the incidence of different types of industrial actions similarly, inferences drawn about the effect of changes in economic or institutional conditions on a particular indicator of industrial disputes such as strikes can be distorted by accompanying changes in the incidence of other types of action.

APPENDIX:
Data Sources

The DIR reports. Officials with the Department of Industrial Relations rely on management, employers' associations, unions, and the media to alert them to the occurrence of a dispute and follow up reports of disputes with requests to the parties for additional information. Since employers and unions are not legally obliged to provide this information, the DIR offers no guarantee of the accuracy or completeness of the reports, a point noted by Frenkel and Coolican (1980:61). However, there is no alternative source of data with which to compare DIR data on the incidence of work bans at any level of aggregation. Thus it is not possible to determine the comprehensiveness of the DIR data on work bans, nor the source or direction of possible biases.[24]

McDonald (1995) compares strike statistics for the manufacturing industry from the DIR reports with aggregate strike statistics published by the Australian Bureau of Statistics. The DIR strike data are found to be highly correlated with ABS data in terms of the number of strikes, working days lost, and the distribution of strikes across industries and states.

[24] Although the Australian Workplace Industrial Relations Survey reports data on work bans, the focus of the dispute data collection was on whether disputes occurred at the workplace. Thus, if a single ban was implemented by a union across multiple employers and workplaces, every workplace would report a ban as having occurred. Similarly, record is only made of whether a dispute occurred during the year but not the number of disputes. See Callus et al. (1991) for further discussion.

Owing to the fact that bans are more heterogeneous and generally less conspicuous than strikes, it is possible that a greater proportion of bans than strikes has gone unrecorded in the reports. However, the lack of evidence of systematic bias in the strike statistics across manufacturing industries is encouraging and suggests that differences in reporting errors across industries for bans may not be large. Nonetheless, caveats about the reliability of the bans data should be borne in mind.

The IBIS database. IBIS is a private company that collects and markets operations data on Australian firms with at least $20 million market capitalization, including private firms, publicly traded enterprises, government enterprises, and foreign-owned companies operating in Australia. One important characteristic of the IBIS database is that the number of firms on which data have been collected has increased steadily over the sample period, reflecting greater resource availability and evolving company objectives. For firms in manufacturing, financial data on 297 firms are available in 1983, increasing to 566 firms in 1986, 801 firms in 1990, and 981 firms in 1993. The nature of the IBIS data collection has meant that the sample across later years increasingly reflects smaller firms. Thus there is a systematic element to the sample selection across years.

Other data sources. Manufacturing establishment-level data by state and industry subgroup (annual)—employees per establishment, industry concentration statistics: ABS 8221.0, 8203.0, 8204.0, 8207.0, 8209.0. Industry concentration data for 1987 only were used because data were insufficient to construct an annual series.

- Gross earnings by state and manufacturing industry subgroup (quarterly): ABS 6248.0.
- Trade union density by industry subgroup (biannual): ABS 6325.0. Industry data imputed for 1990 and then interpolated to give an annual series.
- Average weekly overtime hours worked per employee by manufacturing industry subgroup (quarterly): ABS 6354.0, 6330.0.
- Unemployment rates by state (quarterly): ABS 6101.0.
- Capital-labor ratio: based on net plant and equipment capital stock (ABS 5221.0) and private new capital expenditure on plant and equipment (ABS 5626.0).

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