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Paul Miller and Charles Mulvey

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Author:

Miller, Paul, University of California, Berkeley
Mulvey, Charles, University of California, Berkeley

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WHAT DO AUSTRALIAN UNIONS DO ?

Paul Miller and Charles Mulvey

University of Western Australia and
University of Western Australia and University of California at Berkeley

I INTRODUCTION

In this paper we survey the literature on trade union activity in Australia. The survey is primarily concerned with empirical research which estimates the impact of unions on economic variables. However, the empirical literature must be grounded in a body of theory and it is to that issue that we first turn our attention.

In the century which preceded the 1980s the economic theory of trade unions was developed only sporadically, the most notable advances being due to Marshall [see Marshall (1920)], Dunlop [e.g. Dunlop (1950)] and Cartter (1959). By the end of the 1970s, however, the body of theory was still rudimentary and lacked a general framework at a time when theory in labour economics generally had become sophisticated and coherent. An empirical literature, mainly estimating union relative wage effects, had emerged but made little reference to theory.

The 1980s witnessed a rapid development of the theory of trade unions and an associated empirical literature. It would be convenient for us if a single, all encompassing, theory of unionism had emerged so that our survey of the empirical literature could be contained within a single model. However, the theoretical advances of the 1980s addressed a number of issues with two main, complementary, avenues providing the most important advances.

The first main theoretical advance concerns the distinction between the so-called 'right-to-manage' [RTM] model of trade unions and the 'efficient bargaining' [EB] model [McDonald and Solow (1981), Nickell (1982), Oswald (1985) Farber (1986), and Manning (1992)]. The analysis of the RTM and EB models of unions is mainly concerned with the microeconomics of collective bargaining - whether bargaining between unions and employers is about both wages and employment or only wages, and therefore whether the wage settlement is on or off the demand curve. While the interpretation of the empirical research must take account of the possibility that the wage/employment combination is off the demand curve, the hypotheses investigated in the empirical literature which is the focus of this survey relate primarily to the exit/voice model. Accordingly, we discuss the theoretical basis of only the latter model, and then only very briefly, and concentrate for the rest on the empirical work.

The exit/voice model of union behaviour [Freeman and Medoff (1984)] encompasses a view of union activity which includes two broad dimensions, 'monopoly' and 'collective voice'. These two dimensions provide an analytical framework within which most of the *outcomes* of trade union activity can be considered. However, while they constitute a broad general framework there are a number of other issues which are incorporated into our survey which draw on other theoretical sources - strikes and the union membership decision for example.

The Exit Voice Model

The Monopoly Face of Unionism

Freeman and Medoff distinguish between 'two faces of unionism', the monopoly face and the collective voice/institutional response face. The monopoly face of unionism refers to the ability of unions to raise their members' wages above their competitive levels by use of market power. There is a vast empirical literature which shows that, for a wide range of countries and in many different periods of time, unions have raised significantly the wages of their members relative to non-members. Recent estimates of the union/non-union wage differential, using consistent data sets, range from 26% in the US to 13% in Australia, 8% in Hungary and 7% in Germany [Blanchflower and Oswald (1989)]. However, it remains the case that statistical and economic problems concerning causality, simultaneity and sample selection bias have not been satisfactorily resolved to date and estimated union/non-union differentials must be treated with some caution [see Robinson (1989)]. Nevertheless there is a strong consensus that unions do raise their members' wages above competitive levels. The economic implications of this are clear. Distortion of the structure of relative factor prices by unions brings about a misallocation of labour and other factors of production. National output will be reduced as a result and the welfare of society as a whole diminished. (Note that all monopolies have similar negative effects, not just unions.)

The monopoly face of unionism, therefore, is one which reduces social output and welfare. It will do so broadly in proportion to the extent and degree to which unions actually raise wages above competitive levels. The monopoly face of unionism may also be manifest in relation to variables other than wages. Unions may use their power to impose non-wage constraints on employers. Most restrictive work practices, for example, would come into this category. Moreover, there are a number of grey areas where it is unclear whether particular phenomena are the consequence of union monopoly power or some other factor. Some of these will be mentioned as we proceed.

Note here that union monopoly power will depend in considerable measure on the force of the 'strike threat' [see Dufty and Mulvey (1987)]. Hence, the theory of strikes is in part the underlying theory of the monopoly power of unionism. We discuss this theory in relation to the empirical literature on strikes.

The Collective Voice Mechanism

Freeman and Medoff (1984) identify another, socially positive, face of unionism - the collective voice face. The Hirschman (1970) exit/voice model identifies two main mechanisms of social and economic adjustment - exit and voice. Individuals '..respond to a divergence between desired and actual social conditions by exercising freedom of choice or mobility..'.¹ Dissatisfied customers go to another supplier; dissatisfied workers quit and seek alternative employment. This is the classical adjustment response assumed in most theoretical models of the labour market. An alternative mechanism of response is 'voice'. Instead of responding to dissatisfaction by exiting - going to another supplier or employer - the dissatisfied customer or worker can complain and seek to have the dissatisfaction addressed.

It is fairly evident that in a modern economy where employers often have large investments in the specific skills of their workforce, turnover costs are potentially very high. Exit may therefore be a very costly way for employers to learn that their employees are dissatisfied. Conversely, voice directly and specifically brings to the attention of the employer the sources of dissatisfaction and any subsequent turnover costs incurred due to worker dissatisfaction are presumably the result of calculation. Freeman and Medoff argue that exit will tend to be the predominant response of non-union labour to dissatisfaction while voice will tend to be the predominant response of unionised workers. Why is this ?

First, the individual, acting alone, is vulnerable to employer victimisation and being branded a trouble maker. This may discourage non-union workers from voicing complaints. Unionised workers, however, are generally protected by their collective organisation from employer retaliation and will tend to express complaints through 'collective voice'.

Second, many of the issues which give rise to dissatisfaction in the workplace are of the nature of public goods. Safety provision and work environment are examples. A complaint by one individual, if successful, will bring change which benefits all. However, since it is the individual who will bear the costs of

¹ Freeman and Medoff (1984), p.7.

complaining (in terms of the previous point), there will be a tendency to hold back and wait for someone else to complain or to quit and seek better conditions elsewhere.

The proposition that unionised workers will tend to respond to dissatisfaction through collective voice while non-union workers will choose the entry/exit response has some important implications for firms and for the economy as a whole. We noted earlier that turnover costs in modern industry are likely to be high. The exit/entry response will therefore be costly to firms relative to the voice response, *ceteris paribus*. Since unionised firms are likely to experience voice rather than exit/entry responses, it follows that unionised firms are likely to incur lower turnover costs than non-union firms. On this count, therefore, unionised firms may be expected to display lower costs of production (higher productivity) than non-union firms, *ceteris paribus*.

The collective voice activities of unions within the firm are expected to lead to reduced quit rates and longer job durations and thus to result in greater stability in the employment relationship. Consequently the firm will be encouraged to undertake greater investments in its workforce in the form of training and education and workers will be encouraged to make greater investments in the firm by self-financed training and education, and perhaps also by shareholdings, but most especially by a greater commitment to improving the firm's efficiency.

The benefits of collective voice, and therefore unionism, to firms do not end there. Unionism opens up communication channels between workers and their managers - through collective bargaining, grievance and disputes procedures etc. - which provide for orderly industrial relations and for information flows which may modify the behaviour of all parties. Such communication channels are unlikely to be found in non-union settings, even where management positively tries to create them through such devices as 'open door' policies, because non-union workers will always be inhibited in their responses by their vulnerability to managerial retaliation. On this count too, it is a prediction of the exit/voice model that unionism will tend to raise productivity and thereby enhance the efficiency of firms. Moreover, unions tend to perform a number of functions which can be described as regulatory in nature. One of these involves unions playing a role in monitoring the work performance of their members. The union will, for example, create rules which govern such things as benefits resulting from seniority and work rules which discourage shirking by individuals. Generally these rules reduce rivalry among

workers and encourage co-operation between them and assist in the process of passing on skills through on-the-job training. However, they may also reduce the degree to which merit is the basis for promotion, which will tend to lower efficiency.

One example of the benefits which may flow to the management of unionised firms through enhanced communications is that they are better informed in relation to worker preferences on the balance between the various elements in the compensation package. It is argued that non-union employers target the worker who is at the hiring/quitting margin in formulating compensation packages. Such workers are likely to be young and potentially mobile. The package which suits such workers may not in fact suit the majority of the firm's workforce. In unionised establishments the union will communicate to management the preferences of the median voter and negotiate compensation packages which more closely match these preferences. The result will be a more satisfied - and therefore co-operative and productive - workforce so that both private efficiency and social productivity are increased.

More generally, Freeman and Medoff argue that management can use the information flowing through the channels of voice to '... learn about and improve the operation of the workplace and the production process, ..(so that).. unionism can be a significant plus to enterprise efficiency' [Freeman and Medoff (1984) p.12]. However, beneficial results depend on management responding positively to unionism. Management are quite capable of responding negatively, by asserting managerial prerogatives or by agreeing to restrictive work practices for example, and this would have the effect of reducing efficiency. Moreover, the beneficial effects which are held to flow from the presence of unionism are dependent on the industrial relations climate being good. A poor industrial relations climate will generally negate the potential for efficiency to be enhanced by the better communications between workers and management which are generated by the presence of unionism.

The main thrust of the exit/voice model, therefore, is that unionism can enhance the productivity of the workforce and thereby contribute to increased efficiency in the firm and increase the welfare of society as a whole. (In this last regard, Freeman and Medoff refer to the effects of unionism on wage inequalities. They argue that the impact of unionism is to reduce inequalities in the dispersion of wages and that that is a socially positive outcome. It is not obvious that this would be so in Australia.) As we shall see there is a considerable amount of empirical evidence to

support this general proposition in the US. We must therefore ask whether there are any reasons why we should expect unionism to be associated with high productivity which do not depend on the collective voice phenomenon.

One source of increased productivity in unionised firms is to be found in their hiring policies. When the union establishes a positive union/non-union wage differential the unionised firms will be paying a higher wage than the non-union firms for the same type of labour. Non-union workers will presumably prefer to work for a higher rather than a lower wage and will therefore form a queue at the gates of the unionised firms. Many of those in the queue will, of course, already be in jobs in non-union firms but others will be unemployed. Employers in the unionised firms will then be faced with a rationing problem - how to filter workers out of the queue and into the firm when vacancies arise. Since rationing by price is not available by definition in this situation, profit maximising employers will seek to hire the highest quality workers from the queue. Over time this will result in a redistribution of labour in the market so that the highest quality workers are concentrated in the union sector and the lowest quality workers are concentrated in the non-union sector. This will in itself ensure that the unionised firms display higher productivity than non-union firms. However, the Harvard School of Freeman and Medoff (1984) claim that they have controlled for labour quality differences between union and non-union sectors in their empirical work so that the observed association between unions and productivity is held to reflect some other causal relationship.

The source of many of the productivity augmenting changes at the level of the firm may be found in the response of management to the increase in the union wage. It is often assumed that there exists widespread inefficiency - sometimes known as 'organisational slack' or in Liebenstein's terminology, X-inefficiency - in the unionised firms prior to unionisation. Unions 'shock' management into eliminating any such margin of inefficiency. This association between unionism and high productivity does not reflect the operation of the collective voice mechanism. [See Hirsch and Addison (1986) for a discussion of this issue.]

Notice at this point that any increases in productivity which result from union collective voice activity will be offset in some measure by the higher costs which result from the union monopoly face activity. In terms of private costs and benefits, unionism will only offer net benefits to firms if the productivity augmenting effects of unionism outweigh the cost increases imposed by union wage-raising effects. In terms of the social calculus, other factors such as the social benefits of reduced

wage inequalities due to unionism as well as the social costs of factor misallocation would have to be taken account of.

Within this broad theoretical framework we review the empirical literature on trade union activity in Australia. First, there is a brief description of the institutional aspects of unionism in Australia. Second, we consider the determinants of trade union membership within the context of a supply and demand for union services model. Third, we review the literature on the microeconomic aspects of union impact on labour market outcomes within the framework of the exit/voice model. In particular we consider the effects of unions on relative wages, fringe benefits, quits, layoffs, job tenure and income inequality. Fourth, we consider the macroeconomic aspects of union activity, specifically, the impact of unions on strikes, wage inflation, productivity and profitability. Finally, we summarise and draw some conclusions.

II

THE INSTITUTIONAL SETTING

Australia has a unique institutional framework for the conduct of industrial relations. The provision for compulsory arbitration of disputes between unions and employers coupled with the legally binding character of the awards handed down by the arbitration tribunals marks Australia out from the rest of the world where predominantly voluntary systems of collective bargaining prevail. While compulsory arbitration and the legalism which it has spawned are a fundamental influence on the nature of the industrial relations process, it must not be forgotten that a more or less voluntary system of collective bargaining also operates below the surface, at all levels of activity, is substantial, and defers to the arbitral system only in a formal manner.² Hence the reality of the Australian industrial system is that it is a mixture of a formal system of compulsory arbitration and an informal system of voluntary collective bargaining.

Howard (1977) has argued that Australian unions are primarily products of the system of compulsory arbitration. The arbitration system could not function efficiently without trade unions to represent employees and effectively extended its patronage to unions as a result. The provisions of the *Commonwealth Conciliation and Arbitration Act (1904)* permitted unions simply to register in order to become eligible to obtain a legally enforceable award for their members. Moreover, the

² Deery and Plowman (1991 p. 380) estimate that about 90 per cent of Federal awards are made fully by 'consent', i.e. as a result of a voluntary agreement by an employer and a union and brought to the Industrial Relations Commission only for ratification.

Commonwealth Court of Conciliation and Arbitration had as one of its primary objectives the encouragement of unionism and many of its early decisions supported the establishment and growth of unions. Between 1901 and 1921.. 'Trade union membership grew from virtually zero to more than half the Australian workforce..' [Deery and Plowman (1991) p.219]. By 1989 there were 299 trade unions in Australia and they had 41 per cent of the workforce in their membership. The ten largest unions had 37 per cent of the total membership while the smallest 215 unions had just 7 per cent of the total membership. Union density is highest in the public sector, among males and in the manual occupations.

Australian unions are accorded a special place in the legal environment governing industrial relations. Unions registered under State or Federal legislation enjoy a number of privileges, the main ones being that they obtain access to the industrial tribunals, they are entitled to be recognised by employers, they obtain a legal personality and they are accorded privileges in recruiting members and rights to continue representing members. The principle of exclusive jurisdiction, whereby an established union is protected from competition for its members from new unions or changes to the rules of existing unions, is also a benefit of registration under the Act [see Borland (1989) for a discussion of these and related issues].

Another important feature of the Australian system of industrial relations is that the law requires that the terms of awards apply to all workers within covered employments - both union and non-union. This clearly raises some problems for unions wishing to generate a pay-off to union membership.

III

UNION MEMBERSHIP

Union membership has been declining steadily in Australia in recent years. In 1990 41 percent of employees were members of a trade unions³. Eight years previously the membership rate was 50 per cent, and in 1986 it was 46 per cent. The decline in union membership is apparent for both male and female employees, and for members of the public and private sectors. What determines union membership? And what factors are responsible for the pronounced decline in membership in the last decade ?

³ See Australian Bureau of Statistics (1990a).

Membership of a trade union is just one of the many services that an individual may purchase out of his or her limited income. The major benefits of union membership include the negotiation of wages, fringe benefits and working conditions, and the processing of grievances. The price paid for these services comprises mainly the membership dues. Where individuals are not favourably disposed towards unions, however, there may also be a psychic cost attached to membership.

The empirical research on union membership undertaken by economists in Australia has been based largely on a simple demand and supply model of union services [see Hirsch and Addison (1986, Ch. 2)]. This provides a clear analytical framework that incorporates the general benefits and costs outlined above. Consider first the demand for union services. This may be formulated following Lee (1978) who suggests that each worker has a reservation wage and will join a union only if the net benefits offered by the union exceed this. The reservation wage reflects the monetary and non-monetary costs associated with unionisation and the characteristics of the worker that affect his/her receptivity of unions. Net benefits from union membership include the expected wage gains and additional fringe benefit entitlements associated with union membership. Thus, demand for union services (U^d) may be expressed in general form as a function of the cost of membership (P), the price of substitute goods (S), permanent income (Y^p), taste factors (T), the expected wage gain from union membership (λ), and net non-pecuniary benefits from union membership (Z). That is:

$$U^d = f(P, S, Y^p, T, \lambda, Z) \quad (1)$$

The Australian cross-section studies by Crockett and Hall (1987), Miller and Rummery (1989), Deery and De Cieri (1990) and Christie (1992) implicitly assume that all workers face the same price of union services and of substitutes, and that variables for these factors may therefore be omitted from consideration. Only Crockett and Hall (1986) include a measure of income in the estimating equation, though they use contemporary income rather than a measure of permanent income or wealth. Christie and Miller (1989), Miller and Rummery (1989) and Christie (1992) include estimates of the expected wage gain from union membership in the membership equations. They also model the endogeneity between union membership and wages. However, none of the Australian studies relate differences in union membership to the net non-pecuniary benefits from union membership, even though Miller and Mulvey (1992) show that trade unions have an important impact in this regard.

Finally, all studies include a range of variables for taste factors, including location and personal characteristics, such as educational attainment and gender. These taste factors will reflect attitudes towards the union movement. For example, it is often suggested that rural dwellers are not as favourably disposed towards unions as city dwellers. The taste factors may also act as a proxy for personal preferences towards bargaining. For example, the better educated are often argued to prefer to use their own initiative rather than working through the formal mechanism of a union. Finally, the taste factors may capture preferences for leisure (which will be important where there is a negative trade-off between wages and employment). In the studies by Christie and Miller (1989), Deery and De Cieri (1990) and Christie (1992) direct measures of attitudes towards unions are included in the model.

The supply of union services (U^S) is generally seen as being determined by the cost of membership (P), the cost of organisation (CO), the cost of providing services (CS) and union goals (G). In turn, the cost of organisation and of providing services are seen as functions of characteristics of the workplace such as firm size, dispersion of the workforce, legal structure and the attitudes of the firm and of government towards unions. That is:

$$U^S = g(P, CO, CS, G) \quad (2)$$

Christie (1992) includes measures for firm size in some of her specifications (discussed but not reported). Typically, however, an attempt is made to capture cost considerations through the inclusion of variables reflecting the type of work undertaken, for example, industry and occupation of employment, and more importantly, sector of employment and whether employed on a full-time or a part-time basis.

The reduced form is thus:

$$U^* = U(P, S, Y^P, \lambda, Z, CO, CS, G) \quad (3)$$

Table 1 lists details on five major cross-section studies of union membership in Australia. There is some variation in the independent variables included in the studies, though in each case the variables included can be linked to the supply-demand framework outlined above. The results show that variables reflecting the type of work undertaken are more important than variables reflecting individual characteristics. Union membership is relatively high in the public sector, the processing and manual occupations, and transport, communication and finance industries. It is relatively low in the private sector, professional and administration and clerical occupations, and agriculture and wholesale and retail trade industries.

The individuals' attitudes are of considerable importance to the union membership decision. Thus, individuals who hold negative attitudes towards unions are less likely to be union members, while those who are dissatisfied with their work are more likely to be members of a union. Finally, union membership is positively related to the expected wage gain [see Christie (1992), Miller and Rummery (1989)].

TABLE 1*
**Summary of Major Australian Cross-Section Studies
of Union Membership**

Study	Sample	Independent Variables
Crockett and (1987)	Survey of WAIT graduates from late 1970s, 887 males and females	Gender, marital status, number of children, birthplace, full-time work experience, unemployment duration, industry, sector of employment, earnings, job satisfaction, job tastes
Christie and Miller (1989) Christie (1992)	National Social Science Survey, 1984, 1316 males and females	Gender, marital status, education, location, experience, industry, occupation, expected wage gain, attitudes towards unions.
Miller and Rummery (1989)	Australian Longitudinal Survey (ALS), 1985, 1904 males aged 19-25	Education, qualifications, location, industry, occupation, full-time status, general labour market experience, expected wage gain, job satisfaction.
Deery and De Cieri (1990)	1987 Australian Election Survey, 862 males and females	Gender, marital status, dependents present, education, age, location, white-collar, full-time status, self-employed, supervisory status, sector of employment, social status, spouse in union, attitudes towards unions.

* Expanded versions of this and other tables that contain information on methods of estimation and major findings are available from the authors.

The cross-section union membership studies can be used in various ways. First, the results suggest that the decline in union membership in recent years might be arrested through unions securing greater wage gains for their members. Second, analysis by Miller and Rummery (1989) indicates that, on the basis of cross-section estimates, shifts in either the industry mix or occupational mix of employment are

unlikely to contribute significantly to the recent decline in union membership. Third, the results reported by Christie and Miller (1989), Deery and De Cieri (1990) and Christie (1992) suggest that, as union attitudes are among the most important influences on the union membership decision, the recent decline in union membership may be attributable to a hardening of community attitudes towards unions.

The latter two suggestions have been examined in the research that has adopted a time-series approach to the union membership question. There have been a number of such studies, but we concentrate on four in this survey: Sharpe (1971), Kenyon and Lewis (1990), Peetz (1991) and Borland and Ouliaris (1992). Reviewing just these four studies is sufficient to demonstrate the range of methodologies used, and the consensus of results. The time-series studies have an economic focus, though only Borland and Ouliaris present a model that has links to individual decision making.⁴ Sharpe (1971) and Kenyon and Lewis (1990) base their analyses on the aggregate level model outlined by Ashenfelter and Pencavel (1969). Details are listed in Table 2⁶.

Both Sharpe (1971) and Borland and Ouliaris (1991) suggest that union membership growth is positively related to employment growth. Sharpe's results indicate that the institutional environment is important, though Borland and Ouliaris (1991) argue, rather loosely, that this is unlikely to exercise a major influence on the union membership decision. The discussion of institutional factors in Griffin (1983) suggests that they should not be dismissed so readily. The structure of employment is held to be an important influence on membership decisions in the work of Borland and Ouliaris (1991) and Peetz (1990). In the latter changes in the industrial structure, sector of employment and occupational structure account for up to one-half of the recent decline in union membership. This is similar to the conclusion in Sloan (1985) where differences in the distribution of teenagers/youth and adults across industries and sectors of employment account for up to one-half of the lower unionisation rates of teenagers/youth. Sharpe (1971) and Borland and Ouliaris (1991) both report that change in union membership is negatively related

⁴ An alternative model tested by Kenyon and Lewis (1990) is the business cycle model of Bain and Elsheik (1976). In this model growth in trade union membership is related to union density, growth in money wages and prices, the unemployment rate and growth in unemployment. They report that this specification is dominated, on statistical criteria, by one based on the approach proposed by Ashenfelter and Pencavel (1969).

⁵ Sharpe's (1971) model explains around three-quarters of the variation in the annual growth in union membership. Ng's (1978) analysis shows that a pooled time-series cross-section approach is far less successful in this regard.

TABLE 2
Summary of Major Australian Time-Section Studies
of Union Membership

Study	Data	Estimation Technique	Independent Variables
Sharpe (1971)	Annual 1907- 1969	OLS	Union density in highly unionised sectors, employment growth in highly unionised sectors, unemployment rate, dummy for favourable institutional environment, annual percentage change in real wages
Peetz (1990)	ABS survey data, 1976, 1982,1986, 1988	Shift-share analysis	Industry structure, sector of employment, occupational structure, full-time/part-time employment mix, public opinion towards unions.
Borland and Ouliaris (1991)	Annual 1913- 1989	Co-integration	<u>Long run</u> : employment data disaggregated by gender and manufacturing/non-manufacturing <u>Short-run</u> : union density, real wage and unemployment rate.
Kenyon Lewis (1990)	Annual 1951- 1989	OLS	Growth in real weekly earnings, growth in employment in heavily unionised sectors, union density, unemployment rate, labour in power dummy, Accord.

to union density, the unemployment rate and real wages, with the latter finding being consistent with the empirical evidence reported for the UK [see Carruth and Disney (1988)]. However, in contrast, Kenyon and Lewis (1990) report that union membership is positively related to the unemployment rate and to growth in real wages. The reason for the differences in the estimated effects of the unemployment rate and real wages in the Australian trade union membership studies is most likely linked to different sample periods: Kenyon and Lewis estimate their equations over a much shorter period (1951-1989) than Sharpe (1907-1969) or Borland and Ouliaris (1913-1989). This implies either a structural break in the underlying relationship or a change in the way variables are measured. Finally, Peetz (1990) argues that unless there is a pronounced lag in the relationship between changes in attitudes and changes in union membership, public attitudes towards unions will not be important to the explanation of the recent decline in union membership.

IV MICROECONOMIC ISSUES

Unions and Relative Wages

The stylised model of trade union objectives always assumes that unions will seek to secure a wage rate for their members which is in excess of the competitive rate [see Cartter (1959) for example]. This is achieved by the exercise of market power, which in turn depends on the capacity of unions to restrict the supply of labour and to make credible strike threats [Dufty and Mulvey (1987)]. In the Australian context it is not entirely clear that the conventional analysis applies. Wage rates for the vast majority of Australian workers are set by the arbitral system and apply equally to union and non-union workers. It might therefore be expected that the exercise of market power by unions in order to secure wage gains would leave relative wages unaffected and simply drive the overall wage level above its competitive level at the expense of employment or profits. However, Australian Bureau of Statistics (ABS) data for 1990 show that union members in Australia earned 15.9 per cent more than their non-union counterparts on average [ABS (1990a)]. These are raw data and may therefore reflect the influence of a number of characteristics of individuals which influence wages other than their union status. Various estimates have been made of the union/non-union wage differential after controlling for such characteristics.

The standard method of estimating union relative wage effects is to estimate the following equations:

$$\ln W_{ni} = \beta_{no} + X'_{ni}\beta_{n1} + \varepsilon_{ni} \quad (4)$$

$$\ln W_{ui} = \beta_{uo} + X'_{ui}\beta_{u1} + \varepsilon_{ui} \quad (5)$$

where subscripts u and n refer to the union and non-union sectors respectively, W_i is the wage of the i th individual, X_i is a vector of characteristics which affect wages (e.g. education, experience) and ε_i is a normally distributed error term. $\beta_{uo} = (\beta_{no} + \gamma)$ where γ is the union wage mark-up. There are potential problems of simultaneity in this procedure but these have proved very difficult to address in empirical work [see Robinson (1990)]. Models which endogenise union membership are generally unsatisfactory due to the nature of the identification restrictions required [Lee (1978)]. Accordingly, the problem has largely been ignored in recent literature but is addressed in the work of Christie (1992). A second problem arises from the inability to control for many of the characteristics of the jobs which people actually

do. As a result, the possibility that the estimated union/non-union wage differential is actually a compensating wage differential cannot be excluded [Duncan and Stafford (1980)].

Table 3 summarises the results of a number of studies which estimate the union mark-up for Australia. With the exception of Hatton and Chapman (1987), all of these studies report a positive and significant union relative wage effect. The estimates lie in the range 5 - 15 per cent. Since the two lowest estimates, Crockett and Hall (1986) and Kornfeld (1990) are derived from a sample of graduates and youths respectively, we need not be too concerned at the breadth of the range. The estimates derived from more representative samples, Mulvey (1986), Christie (1992) and Blanchflower and Oswald (1989), fall within a range of 9 - 15 per cent as does the estimate for young males made from the 1985 Australian Longitudinal Survey (ALS) sample by Miller and Rummery (1989).

TABLE 3
Estimates of Union Relative Wage Effects in Australia

Study	Sample	Estimated Union Mark-up
Mulvey (1986)	ABS SSS4 1982. 9,323 males and 5,542 females	Males 9.7% Females 7.4%
Christie (1992)	National Social Science Survey 1984. 1,316 males and females	All 15.2%
Kornfeld (1990)	ALS 1988. 3,082 Young males and females	All 7.3%
Miller and Rummery (1989)	ALS 1985. 1,904 Young males	All 13.1%
Crockett and Hall (1986)	Survey of WAIT Graduates from late 1970s 887 males and females	All 5%
Hatton and Chapman (1987)	ANU 1973 Social Mobility Survey 1681 males Age >30	All 0%
Blanchflower and Oswald (1989)	International Social Survey Programme 1985-87. 1,363 males and females	All 13%

Hatton and Chapman's finding of a zero union relative wage effect when firm size and certain human capital variables are included in the estimating equation requires some comment. [When firm size and the human capital variables were

excluded, a union relative wage effect of 5 per cent was estimated.] First, it must be noted that data utilised in that study refer to 1973, a year of relatively high economic activity. It is well known that union relative wage effects are inversely related to the level of economic activity [Mulvey (1978)]. Second, it might be thought that unionism is picking up an effect properly due to firm size in the other studies reported in Table 3. However, in two of the studies listed, Christie (1992) and Kornfeld (1990), firm size was included as a regressor in the estimating equations and significant union wage effects were still recorded. [There are, of course, some theoretical considerations which suggest that unionism and firm size may be related so it is important to take account of this relationship where data permit.]

Most studies do not distinguish between males and females in computing union wage effects. This is probably due to relatively small sample sizes for females. However, Mulvey (1986) reported a rather larger union wage effect for males than females. Kornfeld (1990) also estimated union wage effects separately for males and females across ALS data for four different years and reported that the union wage effect for men is in the range 11 - 13 per cent and under 5 per cent for women. These findings are broadly in line with US results and presumably reflect the tendency for women to be employed in relatively poorly unionised industries.

Crockett and Hall (1986) and Kornfeld (1990) estimate union wage effects separately for the public and private sectors. Kornfeld estimated union wage effects in the private sector in the range 7 - 10 per cent and in the public sector in the range 3 - 7 per cent for four years from the ALS data. Crockett and Hall (1986) also find that the union wage effect in the public sector is significantly higher than in the private sector. However, this conclusion must be treated with caution since the very small number of non-unionists in the public sector may have distorted the result.

Crockett and Hall's (1986) and Kornfeld's (1990) finding that union wage effects are greatest in the public sector exemplifies the mystery surrounding the whole notion of union relative wage effects in Australia. Uniformity of wages across grades and occupations within the public sector would seem to leave little room for unions to secure a wage mark-up for their members. Similarly, the award-based system of wages in the economy as a whole, with the legal requirement that the terms of the award apply equally to union and non-union workers, appears to pre-empt the possibility of a union relative wage effect. Nevertheless, the empirical literature is almost unanimous in finding a statistically significant and substantial

wage mark-up accruing to union members. This conundrum has been the subject of some investigation.

Mulvey (1986) suggested some possible routes by which a union wage effect might arise in Australia:

- i) that over-award pay may be distributed across the workforce in a manner favourable to union members;
- ii) that union members work more hours paid at premium rates [e.g. overtime or shift work] than non-union workers;
- iii) that union members are distributed across awards in such a way that union membership is disproportionately associated with the highest wage awards.

Miller and Mulvey (1991b) examined the possibility that trade unions may be able to influence the allocation of work paid at premium rates in favour of their members and that this might account for part at least of the observed union/non-union differential in average hourly earnings. Using data from the ALS for 1985 they estimate earnings functions using both average hourly earnings and an overtime-adjusted average hourly earnings series as dependent variables. Comparison of the two estimates permits quantification of the overtime content in the union/non-union wage differential. The result is that the higher overtime component in the earnings of union members accounts for only one percentage point of the estimated union/non-union wage differential of 13.7 per cent.

The next line of inquiry concerned the possibility that the magnitude of the union/non-union wage differential was positively related to union density at industry level and that the mean union/non-union differential for the economy as a whole therefore reflects a compositional effect, that is, because wages are highest in the industries where unionists are most heavily represented, the mean union wage will exceed the mean non-union wage even though there may be no union wage effect in any industry. Estimates of the effects of union density on industry wages, holding constant the effect of individual union status, were made by estimating earnings functions using the ALS 1985 data [see Miller and Mulvey (1989)]. These estimates revealed that union density in an industry is a significant determinant of the wages of both union and non-union workers in that industry. The decomposition of the union/non-union wage differential into the inter-industry component and the intra-industry component revealed that 3 percentage points could be attributed to the influence of union density on industry wages. The *ceteris paribus* component (or the union status wage effect) of the union/non-union

wage differential was estimated at 7.7 percentage points. Hence, while this effect again explains some part of the union/non-union wage differential, it is only a small part.

While no rigorous analysis of the role of over-award pay in the union/non-union wage differential is possible due to lack of data, it seems unlikely that it can account for a significant amount of the union wage effect. One of the authors (Mulvey), in an unpublished study of the Water Authority of WA, found a union/non-union wage differential of over 8 per cent among the employees of that company. However, over-award pay is absent in the Water Authority. Moreover, over award pay is not common in public sector employment generally yet, as we noted above, the union wage effect is estimated to be higher in the public than the private sector.

The mystery of the source of the Australian union/non-union wage differential therefore remains. One possible explanation, which is difficult to test, is that under-award pay (which is illegal, of course) is a common feature of non-union employments. In support of this notion is the evidence produced by Drago, Wooden and Sloan (1992) which reveals '...management's practice of concealing information from employees concerning awards and employment conditions' (p. 132) and suggests that unions perform an important function in informing their members of the provisions of awards.

Unionism, Quits and Job Tenure

A central hypothesis of the exit/voice model is that unionism reduces quit rates relative to non-unionism due to the availability of collective voice as an alternative to exit in unionised establishments. A straight regression of quit rates or job tenure on the presence of unionism or on individual union status is not appropriate as a test of this hypothesis since the relative wage effect of unionism may affect quit probabilities directly. It is therefore necessary to control for the relative wage effect of unionism in estimation. It is also desirable to control for a number of other characteristics of individuals or groups which may influence quit probabilities independent of unionism - human capital characteristics, experience, age, sex, location, size of establishment and occupation for example.

There have been a variety of such studies in the international literature, some involving estimates of the effect of unionism on individual quit probabilities (using microdata sets) and some involving comparisons between quit rates in unionised establishments with those in non-union establishments. Almost all of these studies ,

both those based on individual data and those based on establishment data, find a significant negative relationship between unionism and the probability of quitting or the quit rate, after controlling for the wage and various personal and job-related characteristics of the sample. A large number of such studies are surveyed by Freeman and Medoff (1984). There exist four Australian studies which analyse the relationship between unionism, quits and job tenure [Drago and Wooden (1989) and (1991), Kornfeld (1990) and Miller and Mulvey (1991a)].

In an analysis of data from a 1988 survey of Business Council of Australia firms, Drago and Wooden (1989) report that unionism is associated with reduced labour flexibility, lower worker effort, a greater incidence of industrial stoppages and more restrictive practices⁶. Unionism, however, was not significantly related to 'labour turnover'.⁷ At first glance these results appear inconsistent with the collective voice hypothesis. In fact, Drago and Wooden (1989 p. 335) claim '... there appears sufficient evidence to reject the liberal view of Freeman and Medoff'. Caution is warranted here, however, as a different interpretation can be placed on the results reported by Drago and Wooden. Unionism in this study is measured by a scaled index of managerial perceptions of the extent of union influence over workplace matters. It is essentially a measure of union power.⁸ Variables were also included in the estimating equation to capture the extent of union-management co-operation at both formal and informal levels. While formal union-management structures were typically associated with negative impacts on performance (though they were associated with reduced turnover), the informal union-management structures were associated with improved performance. What Drago and Wooden (1989) may have managed to do, therefore, is to isolate some of the channels through which the monopoly and voice faces of unions operate.

This interpretation of the Drago and Wooden (1989) results is actively pursued in Drago and Wooden (1991) where the study focus is on the relationship between turnover and unionism. In this case, however, Drago and Wooden argue that, with institutionalised unionism in Australia, the union voice effect on turnover is not related to unionism *per se*: voice is only relevant to the extent that unions devote resources to this activity at the plant level and thus will be related to particular

⁶ For an expanded analysis, including case study evidence, see Drago, Wooden and Sloan (1992).

⁷ 'Labour turnover' is defined by Drago and Wooden (1989) as the fraction of the workforce that managers estimate will leave within the next year. It does not necessarily relate only to quits and the extent to which the perceptions materialised cannot be ascertained.

⁸ The specification also included a variable for the number of unions and it had effects similar to those discussed for the union power variable.

aspects of unionism, such as the number of union delegates per union member in the workplace and the presence of formal union-management structures. Both are associated with significant reductions in turnover.⁹

The unit of observation in Drago and Wooden's work is the plant.¹⁰ A more appropriate focus is the individual. In Miller and Mulvey (1991a) the job tenure, quit and layoff behaviour of young males is examined. Union membership is associated with a 46 per cent increase in job tenure, which is three times the corresponding figure in the US labour market. Examination of the quits and layoffs data separately shows that while trade unions are associated with both lower quit rates and lower layoff rates, their impact on quits - a 10 per cent reduction - is less than on layoffs - an 18 per cent reduction. A voice interpretation can be attached to the negative quit-unionism relationship, but the relationship between layoffs and union membership could derive from either monopoly power or voice. Miller and Mulvey (1991a, p.55) suggest that, against the background of institutionalised unionism, collective voice asserts itself '... in the vitality of informal industrial relations machinery at the workplace level which has grown rapidly in extent in recent years.' Kornfeld (1990) shows that the quit and tenure effects reported by Miller and Mulvey (1991a) carry across to both public and private sectors, and to the male and female labour markets.

Fringe Benefits

The compensation package received by a worker comprises both wages and fringe benefits. While the wage component is of far greater importance than fringe benefits [ABS (1990b)], fringe benefits have grown in importance in recent years, particularly superannuation entitlements. This growth could be associated with a change in the emphasis of union activities towards collective voice. As argued above, collective voice is held to enhance communications between the workforce and management so that management is better informed in relation to worker preferences on the balance between the various elements in the compensation package. Study of fringe benefits therefore may provide additional insights into the collective voice activities of unions in Australia. There are, however, only two studies that estimate the union effect on fringe benefits in Australia [Kornfeld (1990) and Miller and Mulvey (1992)].

⁹ Drago and Wooden (1991) also examine the impact of a union density variable and a variable for non-union workplaces. The union density variable is insignificant but that for non-union workplaces is significant and negative. A monopoly power interpretation may be attached to the latter finding.

¹⁰ Aggregate (industry)-level studies in the US reported in Freeman and Medoff (1984, Table 6.3) reveal a negative union impact on exit.

Kornfeld (1990) confines his analysis to employer-sponsored superannuation. Using a logit analysis of data on full-time private sector workers from the ALS 1988 sample he estimates the probability of a worker being covered by an employer-sponsored superannuation scheme. Kornfeld finds that union members are significantly more likely to be covered by superannuation than non-members in the private sector (but not in the public sector), that women are less likely to be covered than men and that employees in large establishments are more likely to be covered than those in smaller establishments.

Miller and Mulvey (1992) analyse the impact of unions on a range of fringe benefits, namely: paid annual leave, paid sick leave, membership of a superannuation scheme arranged by the employer, free or discounted holidays or holiday travel expenses, low interest finance, goods or services at a reduced price, payment of private telephone expenses, payment of gas and electricity bills, private use of a vehicle, other assistance with transport costs, payment of medical expenses or health fund contributions, payment of union dues or professional association fees, and study assistance.

Miller and Mulvey (1992) find that, of the thirteen fringes listed above, the percentage of unionists receiving the fringe exceeds that of non-unionists in eight cases. In seven of these cases the null hypothesis that the mean incidence of the fringe benefit is the same for both groups of workers can be rejected at the 10 percent level or better. In four of the cases where the percentage of non-unionists receiving the fringe exceeds that of unionists the null hypothesis that the mean incidence of receipt of the fringe benefit is the same in the union and non-union sectors can be rejected. *The greatest difference arises in the case of superannuation, where there is a 21 percentage point difference in favour of unions.* Thus, it was concluded that unions are associated with an advantage in the provision of fringe benefits. Miller and Mulvey (1992) also examine the union impact on a measure of total compensation formed by adding the value of fringe benefits to money wages.¹¹ They find that: (a) incorporating the value of fringe benefits into a 'total earnings' measure increases the union/non-union earnings differential from 12.5 per cent to 13.9 per cent; and, (b) holding total compensation constant, of the total union effect on fringe benefits of plus 22 per cent, between 6 per cent and 13 per cent is due to the impact of unions in increasing the share of fringe benefits within the compensation/wage package. This last finding is supportive a strong 'collective voice' role for unions in relation to fringe benefits.

¹¹ The method of analysis is based on Duncan (1976).

Wage Inequality

Freeman and Medoff (1984) argue forcefully that unionism is associated with a reduction in wage inequality in the economy. Thus, they report that in the US 'union wage policies reduce inequality by 15 to 20 per cent among otherwise comparable workers' [Freeman and Medoff (1984), p.86].

Kornfeld (1990) is the only Australian study to examine wage dispersion in the union and non-union sectors. He uses data for youth from the ALS and takes two approaches. First, the dispersion of earnings among unionist is compared with that among non-unionists at a point in time (1988). This comparison reveals that wages in the non-union sample are slightly more dispersed than in the union sample, though the differences in this regard are far less than those reported for the US by Freeman and Medoff (1984). Second, the longitudinal nature of the ALS data is exploited and changes in wage dispersion among workers moving from union to non-union states and those moving from non-union to union states examined. If unionism is associated with a reduction in wage dispersion, then wage dispersion should fall among non-union to union movers, and rise among union to non-union movers. The change in wage dispersion among job movers, however, was not consistent with these predictions.

The inconclusive nature of the evidence on wage inequality for Australia suggests that *union wage policies in Australia do not reduce dispersion*. However, it needs to be remembered that Kornfeld's analysis was conducted using a sample of youth. The collective voice response of unions, which is predicted to lead to a reduction in inequality (the monopoly wage effect will accentuate inequality) is not expected to be exercised to the direct benefit of the young. Future research should therefore examine the extent to which the hypotheses concerning wage dispersion advanced by Freeman and Medoff (1984, Ch.5) carry over to the adult labour market in Australia.

V

MACROECONOMIC ISSUES

Trade Unions and Strikes

There has been considerable variation in the incidence and duration of strikes in Australia in recent decades. For example while 1189 industrial disputes commenced during 1990, this was less than half the number (2420) that commenced in 1980¹². Industrial disputes resulted in 217 working days being lost

¹² See *Industrial Disputes, Australia*, Australian Bureau of Statistics, Catalogue No. 6321.0, (various issues).

per 1000 employees in 1990, about one-third the working days lost per 1000 employees in 1980. Can this variation in the strike data be related to changes in the scale or nature of the activities of unions?

Unions certainly figure prominently in the theoretical discussion of the possible causes of strikes in Australia. Much of this discussion is based on the models of union activities developed by Hicks (1963) and Ashenfelter and Johnson (1969). Hicks' model has two central components: a union resistance curve that describes the dynamics of the union's wage demands, and an employer concession curve that describes the dynamics of the firm's wage offers during the strike period. These are held to converge with strike duration: the wage-strike-duration combination where they are equal determines the strike outcome. But because a strike imposes costs on both parties, strikes may be viewed as the result of faulty information held by one (or both) of the parties to the wage bargaining process concerning the other party's position or strategy (i.e., inaccurate information on the part of the firm about the position or pattern of the union's resistance curve or inaccurate information on the part of the union concerning the position or pattern of the firm's concession curve).

The information bases of unions and firms are most likely to be in error during periods of uncertainty, for example, during inflationary periods. Thus, the inflation rate is typically advanced as a major determinant of strike activity. In addition to showing the potential for uncertainty to be correlated with strikes, Hicks' model has been used to suggest that strike activity should be related to variables that reflect the relative bargaining strength of unions and firms (such as the level of excess demand, profit rate, union power) and the ability of the parties to any conflict to withstand the costs of the strike (which will be related to variables such as the availability of overtime and the profit rate).

In the Ashenfelter and Johnson (1969) model strikes are a means of reconciling the expectations of union members with the wage offers of firms. Hence strikes are based here on misinformation also. A number of hypotheses concerning the determinants of strikes from the perspective of Ashenfelter and Johnson's (1969) model are listed in Phipps (1977, p.304). The observable counterparts to these result in a specification of the strike equation that is similar to that derived from Hicks' (1963) accident model.

The relevance to the Australian industrial relations setting of the genre of model developed to explain union behaviour in the US labour market has been questioned by Bentley and Hughes (1970). They argue (pp. 152-153) that there are three features of the Australian labour market that reduce the applicability of the model. First, the system of compulsory arbitration in Australia absolves unions of the responsibility for strike outcomes. Second, the Australian industrial relations system acts as a constraint on strike activity through penal clauses. Third, the majority of strikes in Australia are over rights issues and protests rather than about wages, the aspect upon which the models of Hicks and Ashenfelter and Johnson focus¹³. Phipps (1977), however, is of the opinion that the American-based models are useful when examining Australian data. He argues that the points noted by Bentley and Hughes (1970) will tend to weaken the behavioural relationships that would otherwise be observed, but will not eliminate them completely. In addition, strikes over non-wage issues (e.g. managerial policy) may be related, in part, to strikes over wages.

A second issue given prominence in the Australian literature by Beggs and Chapman (1987a) is muscle flexing. This involves the use of short strikes to maintain the credibility of the threat of industrial action¹⁴. From this view, unions must take a longer-term perspective when evaluating the costs and benefits of some strikes.

Finally, as strikes are phenomena involving at least two parties, the actions of employers need to be recognised. Employers can precipitate or lengthen a strike. In this regard strikes are held to be related to the discrepancy between actual and desired levels of inventory [Beggs and Chapman (1987a)].¹⁵

The treatment of trade unions in the Australian empirical strike literature varies considerably. Unions are afforded a major role in the cross-section study by Drago and Wooden (1990) but the relationship between strikes and unionism is a neglected aspect of most of the time-series studies. Thus, Drago and Wooden (1990) investigate the relationships between industrial disputation and a number of

¹³ In 1990-91 8.2 per cent of working days lost were the result of disputes over wages. In the case of two-thirds of all strikes work resumed without negotiation.

¹⁴ To quote Hicks (1963, p. 146): 'The most able trade union leadership will embark on strikes occasionally, not so much to secure greater gains upon that occasion... but in order to keep their weapon burnished for future use, and to keep employers thoroughly conscious of the union's power'.

¹⁵ This list of possible causes of strikes is not exhaustive. For example, Bentley and Hughes (1970) suggest that strikes are a means of promoting the status of the man on the shop floor, that status is a normal good, and therefore strikes are expected to vary pro-cyclically.

dimensions of unionism, award type and union-management co-operation.¹⁶ Among the time-series analyses, Perry (1978a) includes a union density variable in an equation that examines variations in strikes, while Beggs and Chapman normalise the number of strikes by union membership as opposed to total employees in one of their studies. Bentley and Hughes (1970, footnote 15) also estimate time lost equations normalised by union membership rather than by total employees. In the other studies the role of unions can only be described as implicit. Table 4 presents summary details on the major time-series studies and Drago and Wooden's cross-section study. Discussion will focus first on the time-series work.

The specification of the strike equation employed varies across the time-series studies. Some analyses provide little more than a classical time-series analysis that decomposes a time series into its trend, cyclical, seasonal and random components. Thus, a measure of the business cycle is included in all studies [unemployment rate for Bentley and Hughes (1970), Perry (1979) Beggs and Chapman (1987b), excess labour demand as measured by vacancy rate minus unemployment rate for Perry (1978a), overtime for Beggs and Chapman (1987a)]. Bentley and Hughes also include a change in the unemployment rate variable, on the grounds that this will capture specific labour market changes, such as redundancies, rather than be a further reflection of the general economic atmosphere that the unemployment rate will capture. Phipps (1977), Perry (1978a)(1979) and Beggs and Chapman (1987a)(1987b) include the inflation rate, Phipps (1977) and Beggs and Chapman (1987a) include a measure of company profits, while Beggs and Chapman (1987a) also include the job vacancy rate and a measure of inventory levels. Most studies [Bentley and Hughes (1970), Phipps (1977) and Beggs and Chapman (1987a)(1987b)] include a time trend, those based on quarterly data include seasonal dummies, and dummies for special events [such as politically motivated strikes in Beggs and Chapman (1987a), the Prices and Incomes Accord in Beggs and Chapman (1987b), and for the recession of 1929-1932 in Perry (1979)].

¹⁶ Creigh and Wooden (1985) provide a comprehensive review of strikes over the period 1946-1982. Thus, data on strike activity, including information by industry and region, and data on method of settlement and cause of dispute are presented, and earlier studies of these data summarised. The broad trends discussed mirror those introduced above.

Table 4

Summary of Major Australian Studies of Strike Activity

Study	Data	Independent Variables
Bentley and Hughes (1970)	Quarterly, 1952(1) to 1968(4)	Unemployment rate, change in unemployment rate, time trend, seasonal dummies
Phipps (1977)	Quarterly, 1960(1) to 1972(4)	Inflation rate, gross operating surplus of companies divided by the national wage bill, seasonal dummies, time trend.
Perry (1978a)	Annual, 1953-1976 1947-1961, 1962-1976	Inflation rate, vacancy rate minus unemployment rate, change in trade union density.
Perry (1979)	Annual, 1919-1939	Inflation rate, unemployment rate, dummy variable for 1929-1932.
Beggs and Chapman (1987a)	Quarterly, 1959(3) to 1983(1)	Inflation rate, inventories relative to GDP, overtime, corporate profit divided by the national wage bill, interaction between profits and overtime, job vacancy rate, seasonal dummies, time trend, political strike dummies.
Beggs and Chapman (1987b)	Annual, 1964 to 1985	Inflation rate, unemployment rate, time trend, dummy for Prices and Income accord of 1983-1985.
Drago and Wooden (1990)	1988 Survey of Business Council of Australia firms.	Variables covered the following areas: general economic environment; employer and workplace characteristics; workforce characteristics; union-management co-operation; award characteristics.

The choice of dependent variable varies considerably. Perry (1978b) reviews the merits and demerits of the various measures of industrial disputes. The most common choices for study of strike activity are days lost per employee [Bentley and Hughes (1970), Perry (1978a)(1979), Beggs and Chapman (1987b)] and average duration [Bentley and Hughes (1970), Beggs and Chapman (1987a)].

Four important findings emerge from these studies. First, there is a negative relationship between the unemployment rate and strike activity. Thus, in periods of high unemployment, unions' bargaining position is relatively weak. The elasticity of working days lost per employee with respect to the unemployment rate is -1.004 in Beggs and Chapman (1987b). A similar pattern over the cycle shows up when an overtime variable is used as a cyclical indicator. Thus, the elasticity of workers

involved in strikes per unionist with respect to the overtime measure is 0.837 [Beggs and Chapman (1987a)].

Second, strike activity is positively related to the inflation rate, a proxy for the degree of uncertainty. This provides some support for the 'mis-information' hypothesis derived from the models of Hicks and Ashenfelter and Johnson. However, the elasticity coefficient varies considerably across sample periods and specification of the dependent variable. For example, it is 0.583 in Beggs and Chapman (1987b), where the dependent variable is working days lost per employee, and it is 0.196 in Beggs and Chapman (1987a), where the dependent variable is number of workers involved in strikes per unionist.

Third, strikes tend to increase when company profits are relatively high. In such times it is presumed that unions' wage demands would rise, and firms' resistance would be lower.

Fourth, trade union militancy, as measured by the change in trade union density, is positively related to strike activity [Perry (1978a)]. An inference consistent with this may be drawn from the study by Beggs and Chapman (1987a). They show that the Prices and Incomes Accord of 1983-85 was associated with a pronounced reduction in strike activity. In part this may be because trade unions were restrained during this period.

In summary, time-series econometric models appear to have been successful in accounting for the variation in strike activity. Models that are cognisant of the political and institutional environment appear to be more convincing than other attempts. Future research should attempt to develop the links between trade union power and strikes that Perry (1978a) has explored.

One practical avenue through which this research could be conducted is to examine cross-section data along the lines of Drago and Wooden (1990). Their study reinforces the main conclusions from Perry's study in that they conclude that the incidence of strikes is relatively high in unionised plants and in multiple union settings. These are aspects that might be associated with the power/monopoly face of trade unions. Strikes were more frequent in work environments where joint union-management committees had been set up. Drago and Wooden (1990), however, could not determine whether such committees were set up in response to a bad strike record or were the cause of the bad strike record. The incidence of

strikes was lower in plants where there was the perception of co-operation between unions and management.

Unions and the Level of Wages

In Section IV we argued that the wages of unionists are at least 10 percent higher than the wages of non-unionists. In other words, unions seem to have a sizable impact on relative wages. The question posed in this section is whether unions can affect the absolute level of wages in the Australian labour market.

There are two ways that one may go about answering this question. The first approach is to explore, from the perspective of both theoretical models and empirical findings, the complex nexus between prices and wages, and between these variables and other economic magnitudes such as unemployment, the money supply and trade union militancy. The second approach is to review recent institutional arrangements for wage setting in Australia.

The extent to which unions are able to affect a rise in the aggregate level of wages is limited by the loss of employment that accompanies the real wage gain. In the absence of accommodative monetary policy, sustained real wage increases could not be achieved without either a continual downward revision of the acceptable union employment target, or a continual increase in union power. Where governments increase the money supply as money wages rise, however, the effect is to relax the unemployment constraint and union wage bargaining might therefore be associated with wage and price inflation. The inability of the Australian government to deliver full employment throughout the past two decades would be expected to limit the price increases that originate from this source.

The manner in which unions bargain over wages may also impact on the inflationary process. The major determining factor here will be the extent to which wage comparisons result in imitative wage behaviour. Where all unions bargain simultaneously, wage comparisons cannot constitute a wage transmission mechanism. But where unions bargain at different times, and where wage comparisons are important (i.e., there is a wage round), then a wage increase in one (high productivity) sector can spread to other (less productive) sectors. In this circumstance, 'flow-on' from an award determined for a high productivity group to awards for low-productivity groups becomes a key mechanism propelling wage inflation.

The Prices and Incomes Accord, introduced in 1983, was a means of circumventing this 'flow-on' problem. Thus, the institutional framework, and the manner in which wage bargains are struck, are important.

The general characteristics of the Australian data are summarised statistically in two recent studies by Alston and Chalfant (1987) and Boehm and Martin (1989). Alston and Chalfant (1987) estimate a model of multi-variate causality between the money supply, wages and prices for the period 1972(2) to 1983(4). Their results suggest that money is exogenous, whereas wages are related to lagged money and current prices, and prices are related to lagged money and current wages. Thus, there was a bi-directional and instantaneous link between wages and prices. Boehm and Martin (1989) estimate a vector autoregression model comprising six variables (prices, wages, unemployment rate, money supply, government expenditure and an import price index) over the period 1956(2) to 1985(2) (2 shorter periods were also examined). Their results show that wages are exogenous to both domestic and foreign factors. Thus, there was a uni-directional link between wages and prices: an increase in money wages leads to an increase in prices.¹⁷ The lack of consensus between the studies by Alston and Chalfant (1987) and Boehm and Martin (1989) on this issue is disconcerting. It may be due to the three additional variables considered in the Boehm and Martin study, or due to the different sample periods. Alston and Chalfant (1987, p.116) exclude the 1950s and 1960s from their estimation period due to the possibility of structural change between this era and that used in their estimations. Different conclusions concerning exogeneity would be expected over different sample periods if the objectives of government had altered.

One other result reported by Boehm and Martin is of interest. They show that the pattern of influence is from wages to unemployment, as suggested in classical theory, rather than the other way around. This position, which echoes earlier work by Boehm (1984), appears to be inconsistent with the emphasis in the Australian Phillips curve literature. Thus, the most popular version of the Phillips curve in Australia is a 'demand-pull' approach that posits a link from excess demand or unemployment to wages [see Parkin (1973)]. A similar link is evident in the studies that examine some aspects of the cost-push thesis [see Perry (1978a), Phipps (1977)]. The results reported by Boehm and Martin (1989), while focusing attention on wage changes, leave unanswered the channel of influence through which

¹⁷ Boehm and Martin (1989, p. 13) conclude: 'Thus, if there is to be reasonable price stability, there is a need for an effective wages policy that limits both the *rate* and *size* of increases in money wages'.

unions can have other than a short-run influence on the aggregate level of wages [see, for example, Hossain (1991)].

Two Australian studies have attempted to integrate aspects of union behaviour into models of wage and price changes [Perry (1978a), Phipps (1977)]. Both use strike activity as a proxy for union militancy, and strike activity is related to economic variables such as the level of excess demand and the inflation rate. Strikes are a transmission mechanism in these models, that is, there are the means through which price changes are transferred into wage changes. A cost-push interpretation can be attached to the findings in Perry's work in that the link between strikes and the inflation rate has strengthened over time, and in Phipps' work there has been an unexplained (trend) increase in strike activity that has led to a greater change in money wages.

Thus, there is a range of positions in the Australian literature: from the extremes of Boehm and Martin and Alston and Chalfant, to the intermediate cases of Perry and Phipps. Why might there be an array of results? According to Carmichael (1990) whether a variable is exogenous depends upon the macroeconomic policy of the day. For example, he suggests 'At the risk of oversimplifying the point, wages under the Accord could be viewed as the primary determinant of base inflation, with monetary policy determining the path of real wages by the extent to which it accommodated the underlying trend'.¹⁸ Nevile (1990) also feels that the Accord determined real wages also, at least within a band. Thus, unions are an important component of wage fixation in Australia. In recent times they probably have been instrumental in affecting the aggregate level of wages. Prior to the floating of the exchange rate, the inflation in Australia may have largely been imported.

The fundamental role that unions can play in wage inflation in Australia has been recognised in recent examinations of the Prices and Incomes Accord. It is likely that both money and real wages were reduced by considerable amounts under the Accord [see Chapman (1990) p.45], suggesting either pressure on wages from outsiders, or a reduction in union power. As union membership has been declining, the latter is a distinct possibility.

Unions and Productivity

The strength and direction of the union-productivity relationship is perhaps the key to understanding the overall influence of trade unions in the Australian economy.

¹⁸ Carmichael (1990, p.303)

Yet it is clear from our introductory remarks that the direction of the relationship between unions and productivity cannot be predicted *a priori*. Simultaneously, unions' voice-face may be associated with productivity enhancing effects and their monopoly-face associated with reduction in productivity: the net effect of unions on productivity must therefore be viewed as an empirical matter.

Since hard data on measured productivity are not available in any data set which also contains information on unions, Australian research on this topic has been confined to the Australian Workplace Industrial Relations Survey [AWIRS] and to a Business Council of Australia (BCA) survey where data on managerial perceptions of relative productivity are available. Three studies have so far utilised these data: Crockett, Dawkins, Miller and Mulvey (1992), Drago and Wooden (1992) and Drago, Wooden and Sloan (1992).

Drago, Wooden and Sloan (1992) examine two indicators of relative productivity derived from the BCA data set. The first indicator is based on comparisons with similar workplaces in other Australian firms and the second is based on comparisons with similar workplaces overseas. Their results may be summarised succinctly: union power is generally used in a manner detrimental to productivity while union-management co-operation and employee participation have positive effects on performance. However, the authors suggest that, because of the presence of a number of perverse results in their analysis, one should not attach too much weight to just this one set of findings.

The AWIRS data were collected during 1989-90. Multivariate analyses of managements' responses to questions concerning productivity at the workplace relative to that at other workplaces in the same industry are reported in Drago and Wooden (1992) and Crockett *et al* (1992). These studies were conducted independently, adopt the same general approach, but differ in the details of the application of that approach. Drago and Wooden report that multiple unionism had a negative impact on productivity but that there was some evidence that union voice, as measured by the extent of union delegate involvement with management negotiations over proposals for change to workplace practices, was associated with enhanced productivity.

The general tenor of the results reported in Crockett *et al* (1992) is the same as those in Drago and Wooden (1992). Thus, Crockett *et al* (1992) report that, whether measured by either the presence of a trade union, trade union density, or the

number of unions present, trade unionism is associated with lower productivity in the Australian labour market. The negative union effect is most pronounced when measured by the number of unions, thus reinforcing the multiple unionism result reported in Drago and Wooden (1992). Crockett *et al* (1992) also show that where quality circles or productivity improvement groups are a feature of the workplace, or where employees have formal representation on the board of management, then productivity is improved. That is, employee involvement in decision-making can lead to enhanced productivity. Trade unions, however, appear to negate these effects. That is '... the presence of unions is found to militate against a great deal of the productivity enhancing effects of employee involvement in decision-making.' [Crockett *et al*/p.101]

These results are in contrast to those produced by most US studies which show that trade unions are associated with higher productivity [Freeman and Medoff (1984), Table 11.1]. However, the Australian findings are broadly in line with those for the UK where almost every study finds that unionism is associated with lower productivity [see Metcalf (1990)]. This represents a major puzzle that future research must confront. One possible explanation of the difference in the findings of US researchers on the one hand and those in Australia and the UK on the other hand relates to two features of unionism in Australia and the UK which set them apart from unionism in the US. First the union wage premium in Australia and the UK at around 10 per cent is less than one half of that typically reported for the US [Blanchflower and Oswald (1989)]. Consequently, the impact of the union wage effect on average costs will be lower in Australia and the UK than in the US. Accordingly, the shock effect on management of increased labour costs which may force them to take measures designed to reduce non-labour costs by improving X-efficiency or reducing 'organizational slack', as hypothesised by Hirsch and Addison (1986), will be less and the consequent increase in productivity lower. Second, unions in Australia and the UK, but not to any extent in the US, are a source of restrictive work practices which will tend to lower productivity and offset increases in productivity resulting from the voice mechanism.

Unions and Profitability

Even where unions increase productivity/reduce costs through their collective voice activities, it is widely accepted that they increase costs as a result of raising their member' wages through the exercise of their monopoly power. The profitability of unionised firms will therefore depend partly on the net impact of unions on the firm's costs. [The issue is somewhat more complex than this. For a theoretical

treatment which addresses the issue see Clark (1984).] Unusually, there is something of a consensus on the impact of unions on profitability. Both for the US and UK almost all studies find that unionism reduces profitability [see Mulvey (1992)]. Two Australian studies have investigated this issue. Drago and Wooden (1992) and Crockett, Dawkins and Mulvey (1992) both utilise the AWIRS data set to analyse the impact of unions on the profitability of Australian firms.

Profitability is measured by rate of return on capital employed. Drago and Wooden (1992) estimate equations using the same set of dependent variables as in their productivity equations discussed above. They find no significant union effect on the rate of return at all.

Crockett, Dawkins and Mulvey (1992) analyse the relationship between unionism and profitability in light of the theoretical model proposed by Clark (1984) where the effect of unionism is held to be mediated by the degree of competition in the product market and the nature of the wage-fixing process. The analysis proceeds by partitioning the sample of firms into two segments, one where the firm faces many competitors and another where the firm faces few competitors. As predicted in Clark's (1984) model, unions significantly lower the rate of return in those firms facing a competitive environment but appear to have no impact on the rate of return in firms in markets where there is little competition. However, when a variable which proxies the ability of the union to bargain over the level of *employment* as well as the wage level is introduced into the model, it appears that unions can increase the rate of return through that mechanism. Hence the presence of unions in a competitive firm reduces the rate of return but, where the union is able to bargain over employment the bargain becomes 'efficient' and off-the-demand-curve, there is a positive effect on the rate of return. This is consistent with the Clark (1984) model although it was somewhat surprising that the efficient bargaining effect was found to outweigh the union present effect.

VI

CONCLUSION

What do Australian trade unions do?

Trade unions in Australia have many of the effects that characterise their overseas counterparts. They are, for example, associated with a wage premium, lower quit probabilities and a greater incidence of fringe benefits. But against this background

of general similarity, many differences emerge between the economic effects of Australian unions and those of unions in other countries. The union wage premium in Australia, at approximately 10 per cent, is less than half that in the US. Similarly, the union effect on quits in Australia is weaker than that reported for the US. And unlike the case in the US where unions have a neutral effect on layoffs, trade unions in Australia are associated with a substantial (18 percent) reduction in layoffs. Finally, the wage policies of trade unions in Australia are not equalising, whereas in the US they are.

At an aggregate level, trade unions do not appear to affect productivity in Australia, a factor we attribute to their smaller effect on wages and their association with restrictive work practices. Nor do they have a pervasive effect on rates of return.

It appears, therefore, that Australian trade unions behave as trade unions are suggested to behave in modern economic theory: they attempt to provide voice and to use monopoly power to win pecuniary and non-pecuniary benefits for their members subject to employment and institutional constraints. Striking a balance between the voice-face and monopoly-face of unions is one of the major issues facing Australian labour relations. Assessing the impact of compulsory arbitration on this balance is an appropriate direction for future research.

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TABLE 1

Summary of Major Australian Cross-Section Studies of Union Membership

<u>Author(s)</u>	<u>Data</u>	<u>Type of Model</u>	<u>Independent Variable</u>	<u>Major Findings</u>
Crockett and Hall (1987)	Mail survey of all graduates from the Western Australian Institute of Technology 1970s (various years), 887 males and females.	Reduced Form	Gender, marital status and number of children, birthplace, full-time work experience, unemployment duration, industry, sector of employment, earnings, job satisfaction, job tastes.	Characteristics of the job (industry, sector of employment) are important determinants of union membership, with membership in wholesale and retail trade and manufacturing being relatively low and that in construction, transport and storage, communications and community service being relatively high for males (industry was not a very important determinant of female unionism) while unionism is lower in the private sector than in the public sector for both males and females. There is a positive link between a preference for job security and union membership for both males and females, while job experience was an important positive influence on male membership but not on female membership.
Christie and Miller (1989), Christie (1992)	1984 Australian National Social Science Survey - representative of population aged 18 years and over, 1316 males and females.	Reduced Form and Structural	Gender, marital status, education, location, experience, industry, occupation, expected wage gain, attitudes towards unions.	Unionism increases with experience and expected wage gain, and is lower among females. Union membership varies appreciably across industries; it is relatively low in agriculture, construction and wholesale trade, and relatively high in public administration and communications. Unionism also varies across occupations; it is relatively low in the professional and administration and sales occupations, and relatively high in production and clerical occupations. Individuals holding negative attitudes towards unions are less likely to be union members, and the attitudes variable is only weakly correlated with the other variables included in the analysis.

<u>Author(s)</u>	<u>Data</u>	<u>Type of Model</u>	<u>Independent Variable</u>	<u>Major Findings</u>
Miller and Rummery (1989)	1985 Australian Longitudinal Survey, 1904 males aged 19-25	Reduced Form and Structural	Education, qualifications, location, industry, occupation, full-time status, general labour market experience, duration of employment, expected wage gain, job satisfaction	Unionisation rates are relatively low in agriculture and wholesale trade and relatively high in the finance and transport industries. Unionisation rates are relatively low in the managerial and professional occupations and relatively high in the process and manual occupations. Individuals with qualifications are more likely to be union members than those without qualifications, satisfied workers are less likely to join unions than dissatisfied workers and membership and expected wages are positively related. The major findings are not affected by compulsory unionism.
Deery and De Cieri (1990)	1987 Australian Election Survey - nationally representative survey, 862 males and females aged 18 and over	Reduced Form	Gender, marital status, dependents present, education, age, location, white collar, full-time status, self-employed, supervisory status, sector of employment, social status, spouse in union, attitudes towards unions.	The groups significantly less likely to be union members are white collar workers, workers employed on a part-time basis, the self-employed, and those with a negative perspective towards unions. Individuals with leftist political ideology and those who favour wealth redistribution are more likely to be union members.

Note: Results reported for the first three studies are derived using a logit model; those reported in Deery and De Cieri are from ordinary least squares.

TABLE 2

Summary of Major Australian Time-Series Studies of Union Membership

<u>Author</u>	<u>Data</u>	<u>Estimation Technique</u>	<u>Dependent Variable</u>	<u>Independent Variable</u>	<u>Major Findings</u>
Sharpe (1971)	Annual 1907 - 1969	OLS	Annual growth in membership	Union density in highly unionised sectors, employment growth in highly unionised sectors, unemployment rate, dummy for favourable institutional environment, annual percentage change in real wages.	Union membership growth is positively related to employment growth and a favourable institutional environment, and negatively related to union density, the unemployment rate and real wages. Model explains around 75 percent of the variation in annual growth in membership.
Peetz (1990)	ABS survey data, 1976, 1982, 1986, 1988	Shift-share analysis applied to cross-tabulations	Union density	Industrial structure, sector of employment, occupational structure, full-time/part-time employment mix, public opinion towards unions.	Up to one-half of the recent decline in union membership is due to changes in the industrial structure, sector of employment and occupational structure. Changes in the part-time/full-time mix of employment are relatively unimportant. Changes in public attitudes towards unions do not appear to be important.
Borland and Ouliaris (1991)	Annual 1913 - 1989	Co-integration	Log of level of union membership	<u>Long run:</u> employment data disaggregated by gender and manufacturing/non manufacturing. <u>Short run:</u> union density, real wage and unemployment rate.	Main long-run influence on union membership is male employment in manufacturing and male employment in non-manufacturing, with the propensity to unionise of the former being greater than that of the latter. The real wage, union density and unemployment rates are negatively related to changes in union membership in the short run.
Kenyon and Lewis (1990)	Annual 1951 - 1989	OLS	Growth in Trade Union Membership	Growth in real weekly earnings, growth in employment in heavily unionised sectors, union density, unemployment rate, Labor in power dummy, Accord.	Trade union growth is positively related to contemporaneous and lagged wage growth, the fraction of the workforce employed in heavily unionised sectors, the unemployment rate, labour in power, and is negatively related to union density and the Accord.

TABLE 3**Summary of Major Studies of Union Wage Effect in Australia**

Author	Data	Estimation Technique	Independent Variables	Major Findings
Mulvey (1986)	1982 ABS Special Supplementary Survey 4, 9323 males and 5542 females	OLS	Education, qualifications, experience, birthplace, marital status, duration of residence, multiple job holder, occupation, industry, location, part-time worker, union status.	Union status is associated with a 9.67 percent wage effect among males and a 7.4 percent wage effect among females.
Christie (1992)	1984 Australian National Social Science Survey, representative of population aged 18 years and over, 1316 males and females.	OLS, selectivity corrected	Education, qualifications, experience, marital status, gender, occupation, location, union status	Union status is associated with a 15.19 percent wage differential. Taking account of sample selection bias results in only a small increase in the union wage effect.
Kornfeld (1990)	Australian Longitudinal Survey, 1985-1988, 3082 young males and females	OLS, fixed effects model	Education, qualifications, experience, tenure, occupation, industry, firm size, marital status, part-time status, public sector, union status.	Union status is associated with a 7.3 percent wage effect in 1988; 11.3 percent for men and 2.1 percent for women. The union wage effect is greater in the private sector than the public sector. In 1985 the union wage effect was 8.3 percent, in 1986 8.9 percent and in 1987 it was 9.5 percent. The estimate of the union wage effect derived from a fixed effect model using data for 1985-88 is 8.5 percent.
Miller and Rummery (1989)	1985 Australian Longitudinal Survey, 1904 males aged 19 - 25	OLS, selectivity corrected	Education, qualifications, experience, tenure, occupation, industry, full-time status, union status.	Union status is associated with a 13.12 percent wage differential; selectivity-corrected results are broadly similar to OLS.
Crockett and Hall (1986) (1987)	Mail survey of all graduates from the Western Australian Institute of Technology 1970s (various years), 887 males and females	OLS	Experience, qualifications, occupation, gender, marital status, number of children birthplace, year of graduation, occupation, public sector, union status.	Union membership is associated with 4.8 percent higher wages.
Hatton and Chapman (1987)	1973 ANU Social Mobility Survey, 1681 males aged 30 years and over	OLS	Education, qualifications, experience, tenure, marital status, location, firm size, post-schooling training, union status.	Union status is associated with a 4.7 percent wage effect in a restricted specification, but is not a statistically significant determinant of wages in a regression where firm size and post-school training is held constant.
Blanchflower and Oswald (1989)	International Social Survey Programme, 1985 - 1987, 1363 males and females.	OLS	Education, experience, gender, marital status, part-time status, union status.	Union members receive a 13 percent wage premium.

TABLE 4

Summary of Major Australian Studies of Strike Activity

Authors	Data	Estimation Technique	Dependent Variable	Independent Variables	Major Findings
Bentley and Hughes (1970)	Quarterly, 1952(1) to 1968(4) disaggregated by sector	OLS	<ul style="list-style-type: none"> ■ industrial disputes per employee ■ days lost per worker involved (i.e. duration) ■ days lost per employee ■ number of workers involved per strike 	unemployment rate, change in unemployment rate, time trend, seasonal dummies	Negative relationship between strike frequency and unemployment rate in both coal and non-coal sectors, little evidence of a cyclical component in the duration and time lost data in the coal industry but some evidence that both duration and time lost in the non-coal sector are negatively related to the unemployment rate and positively related to the change in the unemployment rate.
Phipps (1977)	Quarterly 1960(1) to 1972(4)	2SLS 3SLS	<ul style="list-style-type: none"> ■ number of strikes per employee 	inflation rate, gross operating surplus of companies divided by national wage bill, seasonal dummies, time trend	Strike equation part of 3-equation simultaneous model (explaining strikes and price and wage inflation). The inflation rate and the ratio of gross operating surplus of companies to the wage and salary bill are positively related to the incidence of strikes. An excess demand variable defined as for Perry (1978a) was not considered due to its high correlation with the inflation rate.
Perry (1978a)	Annual 1953 - 1976, 1947 - 1961, 1962 - 1976	OLS	<ul style="list-style-type: none"> ■ days lost per employee 	inflation rate, vacancy rate minus unemployment rate, change in trade union density	The level of excess demand, as measured by the gap between the vacancy and unemployment rates, the inflation rate, and change in trade union density are positively related to strike activity. The latter variable is less important in the 1962 - 1976 period. The unemployment rate has a negative impact when used as a proxy for excess demand.
Perry (1979)	Annual 1919 - 1939	OLS	<ul style="list-style-type: none"> ■ days lost per employee 	inflation rate, unemployment rate, dummy variable for 1929 - 1932	Strike activity is negatively related to the unemployment rate and positively related to the inflation rate and the depression shift variable.

Beggs and Chapman (1987a)	Quarterly 1959(3) to 1983(1)	OLS	<ul style="list-style-type: none"> ■ workers involved in strikes per unionist ■ days lost per worker involved (i.e. duration) 	inflation rate, inventories relative to GDP, overtime, corporate profit divided by the national wage bill, interaction between profits and overtime, job vacancy rate, seasonal dummies, time trend, political strike dummies	The proportion of unionists involved in strikes is positively related to overtime, inventory level and the inflation rate. Average strike duration is positively related to profits and the vacancy rate. The performance of the overtime variable was more satisfactory than that of unemployment and vacancy variables.
Beggs and Chapman (1987b)	Annual 1964 to 1985	OLS	<ul style="list-style-type: none"> ■ days lost per employee 	inflation rate, unemployment rate, time trend, dummy for prices and income accord of 1983 - 1985	Strike activity has a positive trend and is positively related to the inflation rate. It is negatively related to the unemployment rate and the prices and income accord. Cross-country comparisons show that the negative impact of the 1983-1985 dummy is unique to Australia.
Drago and Wooden (1990)	1988 Survey of Business Council of Australia firms	OLS	<ul style="list-style-type: none"> ■ number of work stoppages ■ number of days during which workplace was closed due to strikes 	variables covered the following areas: general economic environment; employer and workplace characteristics; workforce characteristics; union characteristics; union-management co-operation; award characteristics	Strike incidence is higher in unionised plants and in multiple union settings; the incidence is lower where there is the perception of union-management co-operation but is higher in work environments where there are joint union-management committees. The existence of company awards reduces the incidence of strikes.