

Are Pro-Reformers Better Performers?*

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Abstract

There appears to be widespread consensus in industry and government that a switch from centralized bargaining to an enterprise based system benefits productivity. However, research suggests that the link between bargaining structures and worker productivity is dubious and that empirical research has been unable to discover a relationship between them. In this paper we use data from Australian companies at the enterprise level and examine the links between performance and a range of human resources, industrial relations and management variables to determine whether bargaining structures do impact on performance. In particular, we investigate whether organisations that have incorporated aspects of the industrial relations reform agenda have outperformed organisations that have not. The results from the application of a treatment effects regression model show evidence that organisations adopting the industrial relations reform agenda report significantly higher levels of self-assessed labour productivity relative to their competitors, even after controlling for a number of different factors.

J.E.L. Classification: J53, C21

Keywords: Industrial Relations, Enterprise Performance

1. Introduction

There have been considerable changes in the industrial relations landscape in Australia over the past 15 years. The employee coverage of Federal enterprise wage agreements has increased from less than 100,000 employees in March 1992 to 1.5 million employees in March 2002 (Wooden 2000; Department of Employment and Workplace Relations 2002), union membership has fallen from 45.6 per cent in 1986 to 24.5 per cent in 2001¹, there has been a significant amalgamation of unions (Wooden 2000), and industrial disputation is relatively low compared to history². According to Wooden (2000), structural changes in labour markets (that is, a shift away from manufacturing to services), increased competition in product markets, technological change and changes in the organization of work have all had their part to play in shaping the current industrial relations environment. The industrial relations landscape is now dominated by bargaining, and especially enterprise bargaining.

There appears to be widespread consensus in industry and government that a switch from centralized bargaining to an enterprise based system benefits productivity. However, research suggests that the link between bargaining structures and worker productivity is dubious and that empirical research has been unable to discover a relationship between them. In this paper we use data from Australian companies at the enterprise level and examine the links between performance and a range of human resources, industrial relations and management variables to determine whether bargaining structures do indeed impact on performance. In particular, we investigate whether organisations that have incorporated aspects of the industrial relations reform agenda have outperformed organisations that have not. In short, we ask the question “Are pro-reformers better performers?”

The plan of the rest of this paper is as follows. Section 2 examines some of the factors—which include industrial relations reform—that might be expected to affect productivity, and provides a stylised representation of these relationships. Section 3 describes the data that will be used. The data comes from two sources: the Melbourne Institute Business Survey and the IBISWorld financial database. This section also discusses how each of the variables to be used in the estimation is constructed. Section 4 presents the treatment effects regression

¹ ABS Cat. No. 6325.0, *Trade Union Members Survey: Australia*, August 1986; ABS Cat. No. 6310.0, *Employee Earnings, Benefits and Trade Union Membership: Australia*, August 2001.

² ABS Cat. No. 6321.0, *Industrial Disputes: Australia*, March 2002.

model used in this study and the results from estimating the model. Finally, Section 5 discusses our conclusions.

2. Factors Affecting Productivity

This section examines some of the factors that might be expected to influence the productivity levels of the firm. Productivity measures the amount of output produced for a given level of input(s), which, following Laplagne and Bensted (1999), can be expressed as

$$Y = \tau f(E_K, E_L, K, L) \quad 2.1$$

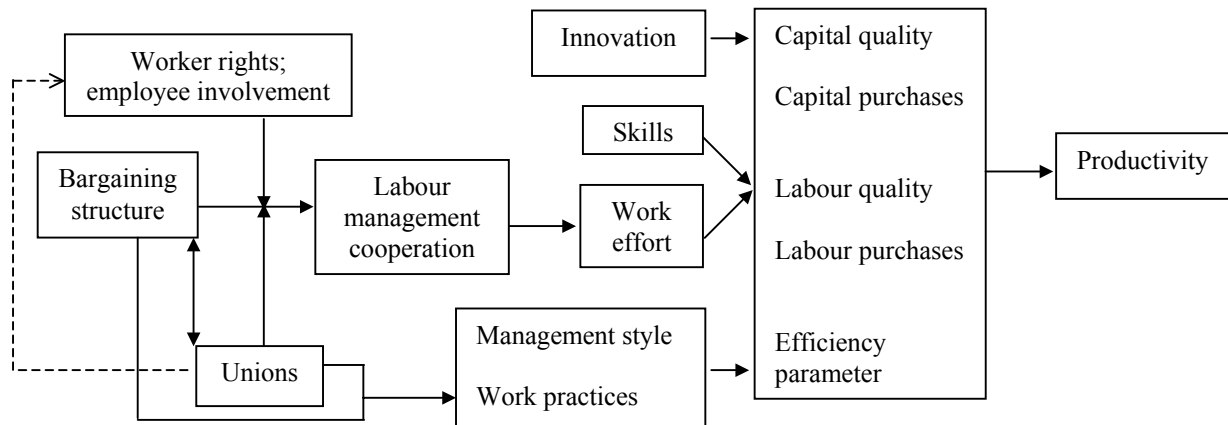
where Y is value added, L is a measure of the labour input, K denotes the capital input, τ is an efficiency parameter, E_K is a measure of the average quality of capital, and E_L is a measure of the average quality of labour. Assuming constant returns to scale, labour productivity can be expressed as

$$\frac{Y}{L} = \tau f(E_K, E_L, \frac{K}{L}) \quad 2.2$$

Labour productivity is therefore a function of the efficiency parameter, the quality of labour, the quality of capital and the capital-labour ratio. Although labour productivity is only a partial measure of productivity, it nevertheless provides some useful information. In particular, if policymakers are concerned about welfare, then measuring value added per employee is a valuable way of determining whether the welfare of employees—compared to employers—has improved (Bartelsman and Doms 2000). The following discussion now turns to what factors might possibly influence each of these parameters.

Figure 1 provides a stylised representation of the linkages between institutional arrangements in the labour market and the productivity performance of businesses.

Figure 1: Stylised Representation of the Links between Labour Market Institutions and Productivity



Source: Adapted from Wooden et al., 2002, p. 19

2.1. Capital quality

From Figure 1, the factors that might realistically be expected to influence capital quality can be expressed as follows:

$$E_K = f(\text{investment, innovation, R\&D}) \quad 2.3$$

The age of the capital stock is an important consideration in productivity analysis, as newer capital inputs are likely to function more efficiently (due to less wear and tear) and may also provide access to any new technology embodied in the capital (Jorgenson and Fraumeni 1992; Geroski 1994). Measures of investment in new equipment and structures are typically included to capture the extent to which firms are replacing and building their capital stock.

An important strand of the literature regarding changes in embodied technology is that of the relationship between R&D and productivity, and innovation and productivity. The relationship between R&D and productivity has been one of the most popular lines of research linking technology to productivity, both in terms of its ability to generate new ideas from the process of undertaking R&D, as well as generating knowledge that helps firms utilise the knowledge embodied in capital generated by other firms (Nadiri 1993; Hall and Mairesse 1995; Griliches 1998). However, while investment in R&D may lead to new innovations within the firm, there is a vast number of firms that introduce innovations without having recourse to expensed R&D. It may be that it is better to simply use another

firms' innovations, as there is evidence to suggest that the knowledge embodied in the innovation itself has a larger impact on productivity growth than the knowledge generated from the inputs into the innovation (Geroski 1994; Griliches 1998). Nevertheless, one of the benefits of investing in R&D and training is that it can improve the likelihood of successful innovation using someone else's idea, which may in turn lead to gains in productivity (Geroski 1994). Such changes in technology also encompass process innovation, which is expected to positively influence productivity by changing the internal capabilities of the firm (Geroski 1994).

2.2. *Labour quality*

Using the stylised representation in Figure 1, labour quality is expressed as:

$$E_L = f(\text{bargaining structure, employee involvement/worker rights, unions, labour-management climate, training}) \quad 2.4$$

This section outlines in more detail the relationship between the factors in (2.4), labour quality and labour productivity.

2.2.1 Worker Skills and Knowledge

Human capital theory suggests that employee skill levels and knowledge will have a positive impact on productivity, since skilled employees may more easily implement and adapt to productivity enhancing changes (Becker 1964; Laplagne and Bensted 1999). Because it is not possible to directly measure worker skills and knowledge, this analysis uses training as a proxy measure, since training plays an important role in worker skill formation.

2.2.2 Bargaining Structures

In terms of this paper, industrial relations reform refers to the changes in industrial relations institutions and practices in Australia since the late 1980s. Key elements of this reform agenda have included the encouragement of enterprise bargaining, promoting the use of individual agreements, making awards simpler and less prescriptive, and reducing the role for industrial relations tribunals. The principle focus will be whether changes in the bargaining structure have affected productivity.

Two of the main methods proposed through which changes in bargaining structures can affect productivity are by improving technical efficiency (through, for example, negotiating changes to work practices and working time arrangements) and by promoting a more cooperative

workplace environment (Dowrick 1993; Productivity Commission 1996). This section will discuss how bargaining structures can promote a more cooperative workplace environment, and therefore influence labour quality. The discussion on how bargaining structures can improve technical efficiency is left to Section 2.3.1.

Bargaining structures are expected to influence cooperation at the workplace through how the economic gains arising from bargaining are shared by different economic agents, that is, “firms are more likely to invest in good employee relations where the gains are expected to exceed the cost of such investments” (Wooden *et al*, 2002, p. 16). Centralised bargaining for the purposes of this paper is characterised as multi-employer collective bargaining.³ Under this framework, employment conditions tend to be standardised and prescriptive. One of the potential benefits is that it does not require employers and employees to negotiate with each other, thereby lowering the cost of investing in cooperative employer-employee relations. However, it also means that any gains will be spread across agents that were not necessarily part of the bargaining process, which may adversely affect the willingness of individuals to invest in better workplace relations (Niland 1984; Wooden, Loundes *et al*. 2002).

Enterprise bargaining on the other hand is characterised as collective bargaining that involves a single employer. Using this bargaining structure it is expected that workplace managers and employees will be able to make more informed decisions about conditions, as they are the individuals that have the most complete knowledge about the workplace. In these circumstances, it is more likely that both parties will invest in a more cooperative working relationship, as they should appropriate most of the rewards. It is possible however that enterprise bargaining will lead to less cooperative outcomes where managerial prerogatives are enhanced at the expense of consultation (Wooden, Loundes *et al*. 2002).

Individual (non-collective) bargaining involves direct negotiations between the employer and the employee. It is possible that individual bargaining can assist productivity by implementing reward systems that link pay to performance, although the use of enterprise bargaining does not preclude the introduction of such payment schemes. Such incentive schemes have been a subject of considerable debate, particularly the adoption of profit sharing and employee share ownership plans. Profit sharing has been hypothesised to boost

³ Collective bargaining are negotiations where different parties are represented by a single bargaining agent, which is typically a trade union in the case of employees and an employer association in the case of employers (Wooden, *et al*, 2002).

productivity through lessening the differences in interests between employees and management (Milgrom and Roberts 1995). This in turn has the effect of greater acceptance of organisational change, increasing worker effort and improving information dissemination within the workplace (Kruse 1992; Milgrom and Roberts 1995).

However, there are several concerns regarding contingent pay as a motivation device: money may not be the best motivator; the perceived lack of employee influence over profit and share prices may not encourage greater effort; motivation and compensation theory emphasises the need to motivate individuals, whereas these schemes are usually group based; and there is a certain amount of risk-sharing on the part of employees that they may not be willing to take. Despite the possible drawbacks of using contingent pay as an incentive scheme to improve workplace performance, several firm-level studies support the hypothesis of a positive association between contingent pay and labour productivity (Cable and Wilson 1989; Cable and Wilson 1990; Wadhvani and Wall 1990; Kruse 1992; Black and Lynch 1997). However, a serious drawback regarding the use of individual based rewards is that it could have a detrimental effect on relations (and therefore productivity) if it breeds resentment among workers by promoting competitive—rather than cooperative—behaviour.

2.2.3 Unions

The importance of the trade union movement in Australia means that any analysis of productivity must include some measure of unionisation at the organisation. The ultimate impact of unions on productivity is hard to judge *a priori*. Freeman and Medoff (1984) suggest that it is the interaction of unions and management at the workplace that ultimately decides the productivity outcome. A complicating factor is the relationship between unions and bargaining structure, as per Figure 1. While unions may influence bargaining structures, (in recent history, unions have facilitated growth in enterprise agreements (Wooden 2000)), it is also likely that the bargaining structure in place impacts on union activity.

Unions have the ability to positively influence labour productivity by giving employees a ‘voice’ at the workplace (which acts as an alternative to quitting the organisation) as well as ‘shocking’ management into adopting practices that are productivity enhancing. Essentially, they “provide a degree of countervailing power effectively underwriting worker cooperation with management” (Wooden *et al*, 2002, p. 17).

On the other hand, the ‘monopoly face’ of unionism—where the workplace is characterised by restrictive workplace practices and adversarial style industrial relations—implies that the

presence of trade unions will have a negative impact on labour productivity. It is also possible that, even where unions possess voice, they may not use it effectively (Drago, Wooden et al. 1992; Deery, Iverson et al. 1994; Deery, Erwin et al. 1995). It has been argued that centralised bargaining can lower the care factor of unions at the workplace, simply because they may feel there is little they can do to affect conditions if the outcome is set at a broader level than the workplace. Enterprise bargaining may help overcome this if it means that unions are more involved in the bargaining process. However, the existence of closed shop arrangements reduces the incentive for unions to trouble themselves with employee concerns (Wooden and Baker 1994).

Despite the burgeoning empirical literature on this topic, considerable debate surrounds the results in support of either hypothesis. Although unionised firms in the United States are typically associated with higher productivity levels (Turnbull 1991), evidence from the United Kingdom and Australia appear to suggest the opposite (Metcalf 1990; Crockett, Dawkins et al. 1992). Therefore, the extent to which the different interactions of the bargaining structure and the activity level of unions affect productivity is a matter for empirical investigation.

2.2.1 Worker Rights and Employee Involvement

The active involvement of employees in determining how production at the workplace is undertaken is also expected to influence workplace performance, with unions possibly having a role in the extent to which employees have clear rights and an active role in decision-making (Ferne and Metcalf 1995; Wooden, Loundes et al. 2002). *A priori* it is uncertain as to which direction such involvement will affect cooperative relations, and therefore productivity. If employee control leads to shirking, or if employees are unwilling to participate, the impact is likely to be negative. On the other hand, if employees know best how to undertake certain tasks, or if they get greater job satisfaction from greater involvement, there could be a positive association through greater worker effort, as illustrated in Figure 1. The majority of empirical findings support the view that employee involvement has a positive effect on productivity (Kochan, McKersie et al. 1984; Voos 1987; Industrial Relations Services 1993). It is also expected that cooperation will benefit from strong worker rights.

2.2.2 Labour-Management Cooperation

A positive relationship between a harmonious work environment and productivity is predicated on the assumption that management and employees have common and competing interests. Poor industrial relations outcomes can be disconcerting for potential investors, and may adversely affect other performance outcomes such as productivity, through, for example, interrupting the production process or reducing worker effort. For example, the degree of cooperation can affect how quickly conflicts are resolved, thereby directly affecting the amount of disruption that occurs due to such conflict. Conversely, cooperative climates may realistically be expected to increase work effort (or intensity—as illustrated in Figure 1), the acceptance of more efficient work practices and process innovations, and greater investment in human capital, which can in turn lead to better productivity outcomes, that is, cooperative activity to pursue common concerns may lead to joint economic gains (Cutcher-Gershenfeld 1991; Wooden, Loundes et al. 2002).

Under this scenario, cooperative relations may result in a shift outwards in the production function, thereby having a sustained impact on the level of productivity. The empirical evidence suggests that more cooperative climates are more productive (Ichniowski 1986; Voos 1987; Cooke 1990; Cutcher-Gershenfeld 1991; Juravich, Harris et al. 1993; Deery, Erwin et al. 1999), although there is not a consensus on this issue (Cameron and Whetten 1983; Gershenfeld 1987; McLeod 1990; Goddard 1994).

2.3. *Efficiency parameter*

The efficiency parameter captures the contributions to output that are not accounted for by the labour and capital inputs. As such, the efficiency parameter is expressed as:

$$\tau = f(\text{bargaining structure, management style, work practices}) \quad 2.5$$

2.3.1 Bargaining Structure

As mentioned in Section 2.2.2, changes in bargaining structures may affect productivity by improving technical efficiency (through enhancing the incentives to introduce more efficient work and management practices) and assumes that firms are not operating on their production possibility frontier. As discussed earlier, there may be little incentive for employees to remove inefficient work practices under centralised bargaining, as wages and conditions may not be related to the performance of either the firm or the individual. Therefore, a shift to

enterprise bargaining may assist in removing inefficient work practices by giving more scope to employers and employees to exchange wage increases for changes in work practices. Under this scenario however, the removal of inefficient work practices are expected to provide a once off productivity improvement.

2.3.2 Management Style

Management style is also expected to influence productivity, both through its impact on the relationship between management and employees, and the method in which they organise production at the firm. For example, case studies of particular firms have found that ‘high performance’ firms are characterised by setting out objectives (strategic plans) and implementing strategies that help to achieve these objectives (operational plans) (McConkey 1983; Frenkel 1990). More aggressive managers in the product market arena may be equally aggressive in their negotiation with their employees or unions (Webster and Loundes 2002). Managers’ decision-making styles with respect to the internal operation of the organisation may also reflect how they deal with employees and unions (Sheppeck and Militello 2000). Previous analysis of the current survey suggests that aggressive, bold, high risk management teams do not have particularly good relations between management and unions, although it makes quantitatively little difference to relations between managers and employees (Webster and Loundes 2002).

It is also possible that there will be an interaction between bargaining structure and management style, given that bargaining structures should be part of management’s strategic decision-making process. How much management are willing to take the initiative however is open for question. According to Drago (1992) and (Hilmer, Angwin et al. 1993), management in the 1980s appeared content to work within the boundaries of the industrial relations system, with very little strategic planning that had anything to do with management employee relations. Although industrial relations reform has now provided employers with the opportunity to take the initiative, it remains to be seen whether they have indeed taken more of an interest in incorporating the personnel function into an overall strategic plan, and whether this in turn has any influence on productivity.

2.3.3 Work practices

As mentioned previously, the organisation of work—or work practices—has the potential to influence productivity. Organisations that are not working on their production possibility

frontier are likely to be characterised as having inefficient work practices, suggesting that a rethink of how work is organised is warranted.

2.4. External factors

Figure 1 represents the internal workings of the firm (that is, factors that employers might be expected to have some control over) and how this impacts on productivity. However, there are also factors beyond the control of the organisation that might realistically be expected to have an impact on productivity.

Sheppeck and Militello (2000) point out that higher volatility leads to higher transaction costs for the firm in the marketplace. In order to limit the impact of these transaction costs, it is expected that a higher level of competition in the product and labour markets will put pressure on companies to put more resources into improving the industrial climate at the workplace (Blandy and Baker 1987; Wooden, Loundes et al. 2002). Low turnover of skilled staff may indicate a tight labour market but may also be a result of a contented workforce. Extensive use of non-permanent labour could lower the cohesion felt among the permanent staff and thus reduce morale and the climate of relations. Alternatively, use of non-permanent labour could increase job security for the ‘core’ workers and thereby improve cooperation and climate. Which of these holds in practice is a matter for the data to decide.

3. Data and Variables

3.1. The Melbourne Institute Business Survey

The top 1000 enterprises (as measured by total revenue) were chosen from the IBISWorld enterprise database to participate in the study. Based on initial calls, 813 surveys were mailed out, with 281 useable surveys returned to the Melbourne Institute, representing a response rate of 28 per cent, which is consistent with surveys of this type. Descriptive statistics for the organisations are given in Table 1, which presents the major industry categories, location and employment size of the organisations in our survey. More than a quarter of organisations were located in manufacturing, with the next highest proportion represented by finance and insurance, wholesale trade, electricity, gas and water supply, and property and businesses services. Importantly however, the distribution of responses across characteristics does not differ markedly from the initial selected population, implying that the responses should not be biased towards a particular group. The main exceptions are: slight over-representation of

electricity, gas and water suppliers, transport and storage and education, with a corresponding under-representation of organisations from wholesale trade and finance and insurance; an over-representation of respondents from Queensland and South Australia, with a corresponding under-representation in NSW; and an over-representation of respondents from the larger firms, as measured by the number of employees.

The survey was aimed at senior management, and as such, it is expected that responses regarding the industrial relations climate will be biased toward the management perspective. The questions covered management style, industrial relations structure, human resources, innovation, the market environment and organisational performance. Questions either called for a categorical response, usually for grouped percentages, or used a seven-point Likert scale with the anchors 1=strongly disagree and 7=strongly agree. Perceptual measures permit comparisons across very different organisations and industries and are easy to collect because they place fewer burdens on respondents than administrative or factual entries. However, they contain a subjective element (and therefore an undefined error), making it unwise to over interpret the findings. To these data accounting and financial information from the IBISWorld database (www.ibisworld.com.au) has been added for the analysis.

Table 1: Organisation characteristics, Australia 2001

	Respondent percentage	Top 1000 percentage
Major industry group		
Agriculture, Forestry & Fishing	0.4	0.8
Mining	2.8	4.5
Manufacturing	26.2	25.2
Electricity, Gas & Water Supply	8.2	4.8
Construction	2.5	2.9
Wholesale Trade	9.2	15.6
Retail Trade	6.0	6.4
Accommodation, Cafes & Restaurants	0.7	0.2
Transport & Storage	5.3	3.8
Communication Services	0.4	1.3
Finance & Insurance	11.0	15
Property & Business Services	8.2	8.1
Government Administration & Defence	0.7	0.4
Education	5.7	2.6
Health & Community Services	3.9	4.0
Cultural & Recreational Services	2.5	3.1
Personal & Other Services	2.5	1.3
Missing	3.9	-
<i>Total</i>	<i>100.0</i>	<i>100.0</i>
Location		
ACT	0.7	1.2
NSW	43.6	49.9
NT	0.0	0.1
QLD	11.4	7.8
SA	7.8	5.3
TAS	0.4	0.9
VIC	27.3	28.0
WA	5.0	6.8
Missing	3.9	-
<i>Total</i>	<i>100.0</i>	<i>100.0</i>
Employment size		
Under 200	11.4	16.4
200 to under 500	14.9	17.6
500 to under 1000	18.1	19.6
1000 to under 5000	39.4	34.7
Over 5000	16.3	11.7
<i>Total</i>	<i>100.0</i>	<i>100.0</i>

Source: Melbourne Institute Business Survey 2001

3.2. *Measuring Labour Productivity and Reform*

This section discusses of the construction of variables to represent the elements of the stylised model presented in Figure 1 above, and starts by considering the measurement of labour productivity. As there is no means of measuring productivity for all companies in the sample using the financial data contained in the IBISWorld database, the modelling uses a self-assessed measure of productivity. The survey asked respondents:

“Please indicate the current level of performance of your organisation relative to your competitors for employee productivity”

Responses were on a seven point scale with 1 = much below and 7 = much above. Table 2 describes the distribution of this variable in our sample. It is interesting to note that respondents used six of the seven points of the scale. However, the majority did assess their labour productivity to be above that of their competitors.

Table 2: Self-Assessed Labour Productivity

Labour Productivity	Respondent %
2	2.1
3	4.6
4	26.7
5	40.6
6	15.3
7	2.5
Missing	8.2

The key question in this research is, controlling for other factors from our stylised model, whether companies that have embraced the industrial reform agenda report higher levels of (self-assessed) labour productivity. The survey asked a range of questions concerning industrial relations issues. Of particular interest to this study is the following:

“Since the late 1980s much effort has gone into reforming industrial relations institutions and practice in Australia. Key elements of this reform agenda have included encouraging enterprise bargaining, reducing the role for industrial tribunals, making awards simpler and less prescriptive, and promoting the use of individual agreements. To what extent has your organisation embraced this reform agenda?”

Responses were on a seven point scale with 1 = not at all, 7 = a great deal. A company was said to be pro-reform (embrace reform) if the response was a 5, 6 or 7. According to this

definition 61% of companies in our sample embraced the industrial relations reform and were thus “pro-reform”.

3.3. Representing the Factors

This section details how the remaining factors contained in the stylised model are operationalised. These factors can be broken into five broad categories: Quality of Capital, Quality of Labour, Unions, Management Style and Market Factors.

3.3.1 Quality of Capital

In addition to the capital–labour ratio derived from IBISWorld data, two variables are used to represent this category. The first of these is a binary indicator equal to one if the company reported that it devoted resources (time, money, labour) to new types of machines, computers, equipment or buildings in the last three years, and zero otherwise.⁴ The second variable measures company expenditure on research and development (R&D) as a proportion of its total revenue, and is constructed using the IBISWorld database.

3.3.2 Quality of Labour

An earlier paper by Webster and Loundes (2002) used factor analysis techniques to construct variables to represent the latent constructs of interest in regards to the quality of labour. In that paper they investigated the management–union and the management–employee climate within these organisations. These were constructed from a series of perceptual responses about how well management and unions on the one hand and, management and employees more generally on the other, cooperated. These questions were derived from Dastmalchian, Blyton et al. 1991, and are a subset of their longer scale. Enterprises that scored highly on the management-unions climates measure reported unions and management had good relations, had respect for one another’s goals, and co-operated and consulted. Senior managers that agreed that employees and management negotiate in good faith, settle grievances promptly, and view their conditions as fair, score most highly on the management-employees climate measure.

⁴ In the survey responses were recorded on a seven point scale with 1=None and 7=A lot. However, in common with a number of other questions this was dichotomised to a binary variable with responses of 5, 6 or 7 being coded as 1 and responses 1 – 4 coded as 0.

Two problems exist when using factor variables as explanatory variables in models. The first is the difficulty in interpreting the values that the variable takes and the second is the potentially large amount of missing data that is present in such constructed factor variables. To address both of these problems, in this study the factor scores from Webster and Loundes (2002) are not used. Instead, summated scales are constructed, based upon the variables (items) that load highly on each factor. The summated scale is constructed as the average score on questions answered that correspond to the factor. To be included in the scale, respondents had to have answered at least half the questions associated with the factor.

Also included under the quality of labour heading is the effort that the organisation has devoted to managerial change in the last three years, on the assumption that the more resources are devoted to managerial change, the better the quality of management.

3.3.3 Trade Unions

Two measures of trade unions are used here. These are both binary indicator variables and relate to the absence of trade unions in the company (no unions) and the majority of an organisation's workforce being members of a trade union.

3.3.4 Management Style

Management-style is represented using summated scale versions of the two factors found in Webster and Loundes (2002). The first factor, 'bold', reflects managers' attitudes towards initiating change through new products, R&D, and whether they favour high-risk projects. The second, 'intuitive', indicates managerial reliance upon intuitive information rather than formal and extensive quantitative analysis for making decisions.

This category also uses the summated score version of the internal labour market system. This variable indicates how well the organisations HR systems comply with normal internal labour market systems. These systems assume a long-term relationship between the employee and enterprise and include the use of sophisticated selection procedures, extensive training, staff appraisal processes, promotion on merit and encouragement given to multi-skilling.

3.3.5 Market Factors and Firm Characteristics

A number of variables are contained in this category. A summated scale version of the factor concerning the external product market found in the Webster and Loundes (2002) study is used. This is constructed from questions that are based on the uncertainty scales of Miller and

Droge, 1986 designed to measure the extent of external market volatility. Scale variables are used to measure industry concentration (high values reflecting a fragmented industry) and for barriers to entry (high values reflecting high barriers to entry.)

Three variables are included to control for firm characteristics that might be expected to influence labour productivity. The size of the organisation is measured using the logarithm of the total number of employees, and an indicator variable is included for whether the organisation uses casual employees. The third variable is the use of collective agreements. Collective agreements are different from awards in that they are the result of bargaining between management and unions or between management and groups of employees. They are often referred to as enterprise agreements or as workplace agreements. Such collective agreements may or may not be approved by, or registered with, an industrial tribunal or Commission. A binary indicator variable is used that takes the value of one if more than 50 per cent of the workforce is covered by collective agreements *and* collective agreements are important *and* they suit the needs of the company.

4. Estimating the Productivity Relationships

A simple regression model that relates (self-assessed) labour productivity for organisation i , y_i , to the factors in our model (e.g. quality of capital), \mathbf{x}_i , is:

$$y_i = \mathbf{x}_i' \boldsymbol{\beta} + \delta R_i + u_i, \quad (4.1)$$

where R_i is the dummy variable indicating whether or not the organisation has embraced industrial relations reform; $R_i = 1$ if organisation i embraces reform. The problem lies in correctly estimating δ , the coefficient that measures the impact of embracing industrial relations reform on labour productivity. There may be a correlation between the willingness (and ability) to embrace reform and labour productivity. For example, an organisation that has lower productivity may be more willing to embrace industrial relations reform, as they have little to lose from undertaking major changes. This is a problem of self-selection, as organisations themselves decide whether they will embrace industrial relations reform. This self-selection will result in a biased estimate of δ (Greene 2000, pp. 933-934).

A better way to model would be to use a “treatment effects” regression model. In this model the productivity equation given in (4.1) above is augmented with a second equation that captures the determination of the factors associated with an organisation embracing reform.

The second component of our model is concerned with the choice of being pro-reform (embracing industrial relations reform). This is given by a binary Probit formulation. The propensity to embrace reform, R_i^* , is given by:

$$R_i^* = \mathbf{z}_i' \gamma + v_i \quad (4.2)$$

An organisation embraces reform ($R_i = 1$) if R_i^* is sufficiently large. Thus,

$$R_i = \begin{cases} 1 & \text{if } R_i^* \geq 0 \\ 0 & \text{if } R_i^* < 0 \end{cases}$$

A key aspect of this model is that the stochastic components in (4.1) and (4.2) will be correlated with correlation equal to ρ . The treatment effects model can be estimated by maximum likelihood (ML) methods under the assumption of joint normality of u_i and v_i ⁵.

In estimating the model it is hypothesised that labour productivity may be determined according to the stylised model of Figure 1 above. Therefore, embracing reform may be related to the effort that the organisation has devoted to managerial change in the last three years, barriers to entry, employee–management relations, union–management relations, internal labour market structures and management style.

Table 3 presents the results of estimating the treatment effects model for our sample. Two sets of results are presented; a full version of the model specification where all variables discussed above are included and a restricted specification where variables with t-ratios below one are excluded.

⁵ We use Stata, Version 7 to estimate the model by Maximum Likelihood.

Table 3: Estimates of the Treatment Effects Model

	Coefficient	t-ratio	Coefficient	t-ratio
Productivity Equation				
Constant	2.2353	3.41	2.6001	6.36
No unions	0.0745	0.37		
Majority unions	0.1337	0.96		
Collective agreements	0.3354	2.12	0.3762	2.41
Market volatility	-0.0164	-0.29		
Concentration ratio	-0.0255	-0.30		
Barriers to entry	-0.0479	-0.50		
R&D expenditure	0.4279	0.23		
Investment/Innovation	0.1510	1.26	0.1405	1.18
Log of employees	0.0445	0.96		
Employee management relations	0.2220	2.39	0.1766	2.43
Union management relations	0.0597	1.10	0.0540	1.32
Casual employees	0.1735	1.26	0.1734	1.29
Capital-labour ratio	2.04E-06	2.53	1.56E-06	2.09
Embrace reform	1.3650	4.93	1.4275	5.88
<i>Wald Test</i>	61.12	14 d.f.	67.55	7 d.f.
Embrace Reform (Y/N) – Probit				
Constant	-1.7454	-2.05	-1.9876	-3.87
Barriers to entry	0.0603	0.50		
Effort	0.2513	1.67	0.2487	1.75
Employee management relations	-0.0448	-0.45		
Union management relations	-0.0123	-0.22		
Well developed internal labour markets	0.2600	2.31	0.2671	2.50
Bold	0.1341	1.28	0.1532	1.70
Intuitive	-0.0026	-0.03		
ρ	-0.7249	-5.99	-0.7435	-7.64
σ	1.0146	10.25	1.0375	11.42
<i>log-likelihood</i>	-402.4211		-416.6441	
<i>B.I.C.</i>	938.8725		908.7991	
<i>Sample Size</i>	213		220	

The variables in the full specification of the productivity equation are jointly significant (the Wald test with 14 degrees of freedom being the large sample version of an overall F-test in a least squares regression).

In the binary Probit equation for embracing reform, well developed internal labour market processes have a positive and significant link with whether or not an enterprise has embraced reform. This may indicate that firms that have transparent and (apparently) fair internal labour market processes find it easier to embrace reform as they are more likely to have the support of employees. Previous analysis by Webster and Loundes (2002) indicates a positive and significant relationship between well-developed internal labour markets and management-employee relations. The effort devoted to managerial change is positively related to whether or not a firm has embraced reform, most likely because the reform agenda is part of an overall strategy that includes a shake-up of management. Therefore, the more effort expended on one is likely to improve the uptake of the other. Having a bold management style is positively related to embracing reform, reflecting the view that those firms that are willing to take the initiative elsewhere are also more willing to introduce the current version of industrial relations reform, although this result is only statistically significant in the restricted specification.

Perhaps the most important result in terms of this paper is those respondents that indicated they had embraced the reform agenda also reported significantly higher labour productivity compared to their competitors, even after controlling for a range of other factors that might be expected to influence labour productivity levels. Unfortunately it is not possible to definitively state from these estimates whether this outcome is the result of an improvement in technical efficiency from removing inefficient work practices (a once off improvement in productivity that has resulted in higher productivity levels than competitors) or a more cooperative working environment. These results indicate that cooperative environments are beneficial to labour productivity, as there is a positive and significant relationship between management-employee relations and productivity, but whether this is because the firm has embraced the reform agenda is a bit more difficult to tell. However, from the Probit equation, there is some indication that this improvement may be partially due to a more cooperative working environment, through the channel of having well-developed internal labour markets.

The two other variables that were significantly related to productivity were collective agreements and the capital to labour ratio. The finding on collective agreements is interesting, because this variable is not highly correlated with whether or not the enterprise had embraced the reform agenda. Essentially, if an organisation has an agreement that covers more than 50 per cent of the workforce, and it is important in shaping the employment and working

conditions for the employees covered, and it suits the needs of the organisation, then it seems likely that there are going to be some positive productivity outcomes. This may provide an indication that part of the better productivity outcomes may explained by the removal of inefficient work practices, as it seems logical that agreements that suit the needs of the organisation are more likely to include provisos that remove inefficient work practices.

Restricting the specification yields estimated coefficients close to those found in the full specification but improved statistical significance through increased t-ratios. The results give strong evidence of correlation being labour productivity and the process of embracing reform. They also show evidence of pro-reform organisations reporting higher levels of labour productivity. Indeed, *ceteris paribus*, pro-reform organisations are estimated to report labour productivity being 1.4 points higher on the seven-point scale. The results must be treated with some degree of caution however, given that we are unable to measure actual labour productivity with our data. It is therefore an open question about whether the gains in self-assessed productivity are reflected in gains in actual labour productivity.

5. Conclusion

This paper uses information from Australian organisations at the enterprise level to address the question of whether organisations that have incorporated aspects of the industrial relations reform agenda have outperformed (in terms of relative productivity levels) organisations that have not. In short, “Are pro-reformers better performers?” Answering this question involved examining the links between labour productivity and a range of human resources, industrial relations and management variables.

The results from the application of a treatment effects regression model show evidence that organisations that have embraced the industrial relations reform agenda report significantly higher levels of self-assessed labour productivity relative to their competitors, even after controlling for a number of different factors. Moreover, collective agreements are also an important part of this process, although only if they apply to the majority of employees, are unique to the organisation, are important in shaping employment and working conditions, and suit the needs of the organisation. Harmonious relations—at least between management and their employees—also have a significantly positive relationship with productivity levels. So, pro-reformers do perceive themselves to be better performers

Profitability is another performance measure that is widely used, although the relationship between industrial relations reform and profitability is a bit more nebulous. Even if there is an improvement in productivity as a result of the reform process, this may not feed through to profit outcomes for several reasons. First, improvements in productivity may be negotiated in such a way that workers receive most of the benefits through higher wages. Second, cost reductions may in fact be passed on to the consumer in the form of lower prices thereby limiting the impact that cost reductions may have on profit margins. Additionally, any impact that industrial relations reform is likely to have on profitability may only be felt with a considerable lag. Indeed, it is possible that if industrial relations reform is costly to implement, then the impact on profits may be negative in the short term. As such, it should be emphasised that positive benefits arising from the reform agenda may depend crucially on the performance measure that one is interested in.

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