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The Effect of Trade Unions on Wages

Alex Bryson *

Abstract – *This article reviews the literature on the union wage premium across countries. It identifies the mechanisms by which unionization may generate a wage premium, discusses the difficulties in obtaining an unbiased estimate of the effects and presents evidence on the size of those effects. The paper concludes with comments on the implications for policy and future research.*

JEL Code: *J51.*

Keywords – *union wage premium, union membership, union coverage.*

What effects do unions have on wages?

A primary goal of trade unions is to maintain and improve workers' terms and conditions, particularly workers who are members of the union, through collective bargaining with employers. Whether unions are successful depends, in large part, on their bargaining strength – which is based on their ability to restrict the supply of labour to the employer – and the ability of employers to concede above-market wages (Freeman and Medoff, 1984).

Unions' bargaining strength is enhanced by the percentage of all workers they represent and leads to a higher union wage premium (Freeman and Medoff, 1981; Lewis, 1986; Stewart, 1987; Schumacher, 1999; Forth and Millward, 2002). Where the vast majority of workers in a given industry are covered by collective bargaining union-negotiated wages have less impact on the employer's cost competitiveness than in instances in which competing employers have ready access to non-union labour. This is because above-market wage costs are faced by all competitors. Unions' success in raising wages is further enhanced if the price elasticity of demand for products or services in the industry is low, as might be the case where there is a monopoly or oligopolistic production, since employers are able to meet additional

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costs from above-normal profits or pass the additional costs onto consumers without undue fear of being undercut by other producers.

It is normally assumed that the mechanism by which unions create a union wage premium is through their direct impact on covered workers' wages through pay bargaining. However, there are a variety of ways in which a union-non-union wage differential can emerge. The first is unions' ability to limit downward wage flexibility in times of hardship relative to their uncovered counterparts: this shows up as a counter-cyclical rise in the premium (Blanchflower and Bryson, 2002). A second is the possibility that union-induced wage hikes limit worker entry to the union sector, or result in job cuts that increase the supply of labour to the non-union sector, thus lowering wages relative to those paid in the covered sector. A third union wage effect, which may compress the union wage differential, is the "threat" effect whereby non-union employers raise their wages to avoid the threat of unionization (Rosen, 1969; Freeman and Medoff, 1981; Farber, 2003).

Union wage policies are also traditionally guided by the principle of a "fair day's pay for a fair day's work", such that wages are attached to jobs rather than individuals' attributes. This wage standardisation policy, coupled with concerns to tackle wage discrimination on grounds of race, gender and disability, often acts to compress wage differentials (Blau and Kahn, 2002) [1]. Whether unions actually compress wage differentials depends on the position of unionised workers in the pay distribution, the union premium attached to different types of worker, and the degree of centralisation and coordination in collective bargaining.

Unions may also have more indirect effects on wages. For instance, their "voice" face lengthens job tenure, which is itself often correlated with higher wages, and alters the incentives employers and workers face when investing in their human capital [2].

Difficulties identifying the causal impact of unions on wages

The discussion above highlights the potential causal effect that unions may have on wages, both in the covered and uncovered sectors. However, there are serious difficulties in being able to isolate the causal impact of unions on wages because of the difficulties identifying the counterfactual, that is, what wages would look like in the absence of unions. The presence of unions in the economy can change the level and distribution of wages generally. In theory, these general equilibrium effects may both raise and reduce the level of aggregate wages in the economy (Farber, 2001). Since it is not possible to observe wages in the absence of unions the effect is very

1. There are a number of possible reasons as to why unions prefer wage standardisation. One is that worker solidarity benefits from a uniform wage distribution (Freeman, 1980a). Another is the prediction under the median worker model that, once the mean exceeds the median, the majority of workers will favour redistribution in favour of the lower paid (Freeman, 1980b).
2. Unions are also known to have effects on fringe benefits and non-wage labour costs, as well as methods of payment, but these are not discussed here.

difficult to estimate. Instead, estimates of union wage effects assume a partial equilibrium framework[3]. Even then, the fact that unionisation is not randomly assigned means that it is very difficult to isolate the true causal impact of unions on wages. Biased estimates are likely to occur because factors unobserved by the analyst which affect wages may also affect worker and employer selection into the covered sector. Thus union status is endogenous with respect to wages. Selection into union status is likely to be a function of both worker and employer choices (Abowd and Farber, 1982). The wage standardisation policy of trade unions is well-known to workers and will be most appealing to those workers with low underlying earnings potential since they have most to gain through unionization. However, not all workers who desire union employment can find union jobs (Bryson and Freeman, 2006). This affords employers the opportunity to pick workers from the queue and since, unlike the analyst, they are able to observe the quality of workers in the queue, they will choose the best in the queue. As Farber (2001: 19) notes, the two selection processes appear to have offsetting effects on the estimated wage gap, with the worker selection implying negative bias and the employer selection implying positive bias. However, the effect of double selection on ordinary least squares (OLS) estimates of the union wage gap is uncertain a priori since it depends on the relative size of the two biases.

This is not the only selection issue that may affect estimates of union wage effects. A second is unions' choice of employer for organizing, a choice that is likely to be influenced by the cost of organising, the benefits of organising – and, in particular, the availability of surplus profits – and working conditions conducive to worker desire for union solutions (such as low or unfair pay). Third, employers may have some choice as to whether they are in the covered or uncovered sector, or the type of collective agreement they adhere to.

For these reasons analysts have experimented with alternative methods in identifying the effect of unions on wages. Ever since H. Gregg Lewis's pioneering research (1963; 1986) in which he argued that OLS estimates were the least biased estimator of union wage effects, most analysts have contented themselves with estimates of a union *membership* wage premium based on OLS. However, OLS only returns an unbiased union impact where all factors influencing both unionisation and wages are accounted for. This "selection on observables" assumption, known as the conditional independence assumption in the treatment literature, requires a very rich set of covariates. In practice, most analysts rely on cross-sectional individual or household-level data. These contain only a small number of workplace characteristics. Recent empirical research indicates that, at least in the case of Britain, the paucity of employer controls tends to result in an upward bias in union wage effects. This is because unionised workplaces tend to be better paying than non-union workplaces for reasons that are not directly attributable to membership (Blanchflower and Bryson, 2004)[4]. The linkage of

3. Where union wage setting affects a large percentage of the working population and union effects are sizeable general equilibrium effects are likely to be substantial. For an example of such a study see Sanner (2003).

4. Other studies (*e.g.* Farber, 2001; Robinson, 1989) have shown that biases in OLS cross-sectional estimates due to unobserved heterogeneity may both upwardly or downwardly bias the "true" impact.

employees to employer data is thus likely to reduce the bias in estimating union wage effects [5].

OLS estimation also assumes a functional form for the wage equation which means that union effects may be recovered for workers for whom there is no true counterfactual in the non-unionised sample. In the treatment literature this is referred to as extrapolating beyond the "common support" which is the range of probabilities for treatment (in this case union membership or coverage) where one can find both members and non-members. This limitation of OLS can be overcome using propensity score matching though as yet there are few PSM estimates of the union wage premium (Bryson, 2006).

Both OLS and PSM rely on the assumption that selection into unionisation is captured with observable data. However, there are good reasons to suspect that, even with rich linked employer-employee cross-sectional data there are likely to be factors determining both unionisation and wages which are not observable to the researcher. These include worker motivation which may lead workers to become union members – if, for instance, they wish to have a voice in workplace organisation or job design – as well as affecting their wages (for instance, through the effort they devote to their job). This has led researchers to explore methods of tackling selection on unobservables. With cross-sectional data this entails the simultaneous estimation of union status and earnings to account for the simultaneity. The approach relies on arbitrary assumptions regarding functional form and the use of instrumental variables which affect the probability of union status but do not have a direct bearing on wages. These instruments are hard to find and it is generally difficult to design them into surveys. Furthermore, they often lead to unstable estimates which are frequently much larger than those obtained through other methods (Lewis, 1986) [6].

Additional identification opportunities arise when the analyst has longitudinal data. Analysts have identified union effects on wages by looking at wage changes among workers who switch in or out of union membership (Freeman, 1984). Misclassification of union status and measurement error tend to downwardly bias panel estimates (Freeman, 1984). Furthermore, union switching may be endogenous, that is, whether or not a worker enters or leaves membership may itself be a function of wages. However, observations on workers (workplaces) over time allow the analyst to net out time invariant factors associated with the worker (workplace) that may influence unionisation and wages, thus permitting an estimate of union effects on wages net of the fixed differences between workers (workplaces). If one combines matching, as described in the case of PSM above, with longitu-

5. Where covered and uncovered workers are present in the same workplace multiple employee observations linked to workplace data make it is possible to estimate the within-workplace effect of coverage. However, when interpreting such estimates one needs to bear in mind the "spillover" effect of coverage in pay setting for non-covered workers. Forth and Millward (2002) present evidence of this spillover effect. Booth and Bryan (2004) use multiple worker observations per workplace to estimate the union membership wage premium among covered workers.

6. Reasons why IV impacts differ so much have recently been discussed in Heckman *et al* (2006). They show IV estimates vary where returns to treatment are heterogeneous and individuals select into treatment with partial knowledge of idiosyncratic returns.

dinal data, one can recover matched difference-in-difference estimates of union wage effects which account for observable and fixed unobservable differences between union and non-union workers [7]. Union wage effects might also be captured where natural experiments occur which provide exogenous variation in union status. This technique has been used in the USA where identification is based on changes in state laws governing union organising. Unfortunately for the analyst, these occur relatively infrequently.

Perhaps one of the best known recent examples of recovering union wage effects is that by DiNardo and Lee (2004) in which they used a regression discontinuity design to estimate the effects of being in a unionised environment relative to a non-unionised environment using the narrow margin between union success and failure in the vote for representation. Whilst ingenious, these data are rarely available. Furthermore, this sort of regression discontinuity design captures union effects only at the margin of "just" being union or non-union.

Union coverage and union membership

The form that union pay bargaining takes differs a great deal across countries such that what is meant by "union effects" on wages differs markedly with the institutions in place. The bulk of the early literature on union effects was conducted in Anglo-American countries where most pay bargaining occurs at company or workplace level. [8] Analyses relied on individual and household surveys where measures of coverage were treated with suspicion such that analysts focused on union membership as the preferred union measure. This is a reasonable proxy for coverage in the United States since, once organised, employees in a workplace tend to join the union even in right-to-work states (Bryson and Freeman, 2006). It is less appropriate in the UK since the correlation between union membership and coverage is not strong (Andrews *et al.*, 1998).

This tradition of focusing on union membership effects is not helpful in the European context since in most Continental European countries (Belgium, France, Germany, Italy, the Scandinavian countries and Spain) the vast majority of workers are covered by collective labour agreements, whether they are union members or not [9]. Bargaining may occur at national, sectoral, regional or company level, with many workers covered by bargaining occurring at more than one level. Abowd and Farber's (1982) queuing model and Lee's (1978) "worker choice" model may be less relevant in this instance. Instead, it often makes sense to estimate the effects of different types of collective bargaining. The level at which collective bargaining occurs and the degree of coordination between bargaining levels may affect both the level and distribution of wages.

7. This design remains vulnerable to trend effects over time that impact on union and non-union workers differently, as well as potential compositional differences in the union and non-union workers over time.
8. The demise of sector-level pay bargaining in the UK means that this is even more the case today (Millward *et al*, 2000; Kersley *et al*, 2006).
9. Furthermore, in many cases EU states mandate the extension of collectively agreed terms and conditions to uncovered workers.

Table 1: Union Membership Wage Premium from Around the World

Country	Years	Union % increase
Australia	1994, 8 & 9	12
Austria	1994, 5, 8 & 9	15
Brazil	1999	34
Canada	1997-9	8
Chile	1998, 9	16
Cyprus	1996-8	14
Denmark	1997-8	16
France	1996-8	3 (ns)
Germany	1994 –9	4 (ns)
Italy	1994, & 8	0
Japan	1994-6, 8, 9	26
Netherlands	1994 & 5	0
New Zealand	1994-9	10
Norway	1994-9	7
Portugal	1998-9	18
Spain	1995, 7-9	7
Sweden	1994-9	0
UK	1993-2002	10
USA	1973-2002	17

Source : ISSP, 1994-1999. Based on Blanchflower and Bryson (2003)

Notes: dependent variable log of earnings variously defined. * indicates statistically significantly different from zero. Controls are age, age squared, years of schooling, private sector, hours and union status. Sample restricted to employees. Germany includes East and West. Dependent variable defined as follows:

Australia	Yearly income in Australian $
Austria	R's personal net income per month in shilling
Canada	In what range would your own personal income fall in Canadian $
Chile	R's monthly net income in CLP
Cyprus	Monthly gross earnings before taxes in Cyprus Pounds
Denmark	R's earnings per year before taxes in Dkr
France	R's monthly earnings in Francs
Germany	R's net earnings per month after taxes and social insurance in DM
Italy	R's net income per month in thousands of Lire
Japan	How much did you earn yourself last year before taxes in thousands Yen.
Netherlands	R's income after taxes in Gld
New Zealand	Yearly income from all sources before tax in N.Z.$
Norway	Personal gross income before taxes and allowances in 1997 include retirement benefits etc
Portugal	R's monthly average net income in escudos
Southern Ireland	Weekly gross income before taxes and social insurance
Spain	R's monthly earnings in pts
Sweden	Approximate income per month before taxes in SEK.

Evidence on union wage effects

In the empirical literature for the Anglo-American world what is usually estimated is the difference between the ceteris paribus earnings of union members and those of non-members. That is, how much would wages change if an individual moved from non-union to union status or vice versa, holding constant their individual and workplace characteristics? Using the International Social Survey Program (ISSP) data for 1994-99 Table 1 shows the union wage premium in seventeen countries. There are five countries – France, Germany, Italy, the Netherlands, and Sweden, where the union wage premium is zero. According to Blanchflower and Bryson (2003: 211) this is "primarily due to the fact that unions are also able to control wage outcomes in the non-union sector" by extension of collectively bargained rates.

Where most workers are covered by a collective bargaining agreement focusing on union membership effects is not particularly valuable. Instead exploration of union wage effects should address the question: what effects do collective bargaining arrangements have on wages? This is the approach adopted by those studying wage setting in Continental Europe. Although institutional arrangements vary markedly across countries, one can distinguish broadly between countries where industry-level arrangements can be combined with firm-level bargaining and a smaller group of countries – notably Germany and Britain – where industry-level and firm-level bargaining tend to be alternatives to one another (Schnabel *et al.*, 2006). We discuss the evidence relating to both types of system in turn.

Plasman *et al.* (2005) and Dell'Aringa and Pagani (2006) examine the effects of combinations of different levels of bargaining on wages using the European Structure of Earnings Survey for 1995. Plasman *et al.* concentrate on the role of company-level agreements in manufacturing in Belgium, Spain, and Denmark. They find that in Belgium and Denmark company-level collective agreements raise average wages and increase wage dispersion compared to multi-employer agreements. In Spain, company-level agreements also raise average wages but wage dispersion is actually lower under company-level agreements [10]. The authors suggest their results are consistent with employers in Belgium and Denmark using company agreements to adapt the pay structure to specific needs of the firm whereas, in Spain, they are used by unions to compress the wage distribution. In their analyses of pay compression in Belgium, Spain and Italy Dell'Aringa and Pagani consider the pay compression effects of single-employer and multi-employer collective bargaining combined relative to the "default" case of multi-employer bargaining. They find pay is no more compressed among workers covered by multi-employer bargaining alone, suggesting that any increase in dispersion arising from the addition of single-employer bargaining is mirrored in "wage drift" in the multi-employer bargaining

10. Most other studies for Europe indicate that company agreements raise average wages. See Dell'Aringa and Lucifora (1994a) for the Italian metal/mechanical industry; Hartog *et al.* (2002) for the Netherlands' private sector; Rycx (2003) for the Belgian private sector; and Cardoso and Portugal (2003) for the Portuguese private sector.

only sector[11]. Taken together, these results indicate that both the level at which bargaining occurs and the degree of coordination between bargaining levels can affect wage levels and wage dispersion. However, effects differ across studies. Furthermore, only some of these studies account for endogenous selection of bargaining regime by employers, an issue to which Corneo and Lucifora (1997) have drawn attention.

In Germany and Britain industry-level bargaining agreements tend to be alternatives to company-level agreements. In both countries bargaining coverage has been in decline (Schnabel *et al.*, 2006). The level at which bargaining occurs has not been a focus of empirical research on wages in Britain, but it has in Germany. Using data on large manufacturing firms for 1990, 1995 and 2001 from the Lower Saxony Salary and Wage Structure Survey Stephan and Gerlach (2005) find employees covered by collective bargaining agreements receive higher wages than uncovered workers. However, there is no significant difference in the pay of those covered by industry-level and firm-level agreements. Using linked employer-employee data from the German 2001 Structure of Earnings Survey Fitzenberger *et al.* (2007) stress the importance of distinguishing between individual worker coverage and firm-level shares of covered employees. Firm wages rise with the share of covered employees, the effect being similar for firm-level and industry-level agreements, but individual coverage attracts a negative pay premium which is larger at higher quantiles of the wage distribution due to the pronounced effect bargaining coverage has in reducing wage inequality[12].

Gürtzgen (2006) illustrates the value of longitudinal linked employer-employee data by using firms that switch bargaining regime to identify the effects of industry-level and firm-level agreements on employee wages. She is able to use fixed effects specifications to account for unobservable factors that determine selection into different bargaining regimes. Having done so she finds no wage premium for firm-level agreements in western Germany and no wage premium for industry-level contracts in eastern Germany. However, there is a small statistically significant wage premium of about 2% for industry-level contracts in western Germany and a similar premium for firm-level contracts in eastern Germany. The author finds stronger selection effects associated with industry-level bargaining in eastern Germany compared to western Germany, and explains this finding in terms of the greater degree to which industry-level bargaining is at the firm's discretion in eastern Germany. She concludes: "In western Germany, membership in an employers'

11. The effects of company-level bargaining agreements on pay dispersion differ across studies and countries. As noted above, Dell'Aringa and Pagani (2006) find no effects relative to multi-employer only bargaining; Dell'Aringa and Lucifora (1994b) find company agreements reduce pay dispersion between firms in the Italian metal-mechanical industry; Checchi and Pagani (2004) find they reduce wage inequality in the Italian private sector; Rycx (2003) finds they increase inter-industry pay differentials; but Dominguez and Gutierez (2004) show that they reduce dispersion in wages within firms in the Spanish private sector. Dell'Aringa *et al.* (2004) find no stable results in their study of within-firm wage dispersion in Belgium, Spain, Italy and Ireland.
12. As in the case of Britain (Blanchflower and Bryson, 2004), Fitzenberger *et al.* (2007) show that much of the union wage premium is accounted for by individual and employer characteristics that are usually only present in rich linked employer-employee data.

association is likely to be more exogenous, since it presumably reflects to a larger extent the result of a historically grown industrial relations structure."

There is substantial evidence to suggest that union wage effects differ across workers and workplaces [13]. Where union wage effects are heterogeneous the effects of unionisation on covered workers (relative to their counterfactual non-coverage status) are liable to differ systematically from the estimated effects of coverage for those who are currently uncovered. Thus, the effects of unionisation on covered workers are likely to differ from estimates of unionisation effects for the average worker, or indeed for the worker close to the margins of coverage. Since different estimation techniques recover different parameters it is important to bear this in mind when comparing union wage effects across studies [14].

Change over time in the union wage premium

Changes in unions' monopoly power may bring about changes in the level of the union wage premium. Stewart (1995) suggests that the demise of the closed shop in Britain has reduced the union wage premium. More generally, one might have anticipated a secular decline in the union premium arising from increased opportunities for union employers to substitute non-union for union labour. These opportunities arise with declining union density in developed countries and the ability to outsource production to non-unionised labour in less developed countries. In fact, there is little empirical evidence in support of a secular decline in the union wage premium in Britain and the US (Blanchflower and Bryson, 2004). There is also no evidence that increased competition induced by higher import penetration has lowered union wage premia. In fact, quite the reverse: Bratsberg and Ragan (2002) and Blanchflower and Bryson (2003) show higher import penetration raises the premium, perhaps because organised workers are more able to resist downward wage pressures that this induces, at least in the short-term.

Stephan and Gerlach (2005) is one of the few studies presenting evidence of changes in union coverage effects over time. They find an increase in the premium attached to collective bargaining coverage in Germany over the period 1990-2001 for both industry-level and firm-level agreements.

Future research and policy implications of existing research on union wage effects

Investigations of union wage effects need to adopt theoretical frameworks that are pertinent to the countries at hand and their institutional arrangements. In countries where bargaining coverage is near-universal, studies focus on the levels at which bargaining occurs and the degree of coordination between them. Where company

13. For a review of this literature with particular emphasis on union membership wage effects in the USA and the UK see Blanchflower and Bryson (2003).
14. For more information on the relationship between different treatment effects and how they can be reconciled see Heckman *et al.* (2006).

or workplace-level bargaining occurs it is also important to take account of local union bargaining power. In Anglo-American countries, most of which are characterised by more fragmented bargaining occurring predominantly at workplace or company-level, it is relevant to consider the effects of both union coverage and membership.

Although economists have devoted much attention to the analysis of union wage effects in the USA and the UK, the literature on union effects elsewhere – including Continental Europe – is small. Consequently, little is known about union effects beyond the USA and the UK.

For the purpose of policy formation it is not enough to know the size of union wage effects. One also needs to know where the above-market wages come from. One also needs to know whether unions' propensity to compress pay is useful or harmful from both economic and welfare perspectives. To the extent that unions challenge employer payment of wages below marginal product (*e.g.* due to monopsony power) unions may perform social good (tackling discrimination and low pay) with no economic harm – and even some benefits (*e.g.* in the form of greater purchasing power). Similarly, if above-market wages derive primarily from surplus profits, these may be diverted to workers with minimal economic costs [15]. From a theory perspective, it may be unsustainable to pay workers above their market wage. However, efficiency wages can induce greater worker effort, as can perceptions of fairer pay. It is also unclear from a theoretical perspective whether union-induced pay compression is good or bad for firms. Whereas a more dispersed wage structure may create incentives for workers to increase effort, recent results from laboratory experiments suggest that incentives decline above a certain level of inequality (Freeman and Gelber, 2006).

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