Wage interactions: comparisons or fall-back options?

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Abstract

This paper examines the role played by wage comparisons in pay bargaining when workers have a fall-back option. The effect on wages due to wage comparisons can be difficult to distinguish from the effect of the fall-back wage. It is shown that the use of wages of a recognised 'pay leader' resolves this problem. The empirical work employs a unique panel of data covering 321 unionised bargaining units in the UK chemicals industry between 1978 and 1989. Results support anecdotal reports of pay leadership and suggest that wages elsewhere matter because comparisons are important to workers. In this sense, the results support the notion that 'fairness considerations' drive wage interactions.

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1 Introduction

There is a substantial amount of evidence, both anecdotal and empirical, that wages elsewhere affect wage determination. There is less agreement about *why* wages elsewhere matter. Industrial relations, sociology and psychology literatures emphasise the importance of *comparisons* and often link this to 'fairness considerations' and 'equity'. From the standpoint of industrial relations, Ross (1948) has argued that "comparisons play a large and often dominant role as a standard of equity in the determination of wages under collective bargaining" (page 50). The psychologist Adams (1963) is generally credited with the original formulation of 'equity theory' — the notion that agents compare their relative 'inputs' and relative rewards. The sociological counterpart to this theory is Runciman's (1966) relative deprivation theory; this too claims that people's conceptions of fairness are based on comparisons with salient others.

Economists, on the other hand, have generally emphasised different explanations for the apparent importance of the wages of others. In particular, the popular 'pure' bargaining model predicts that wages elsewhere will affect wage determination because they form part of the 'fall-back' or 'outside' option of workers.[1] In the pure bargaining model the influence of others' wages has nothing to do with fairness-related comparisons.[2]

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[1] This is demonstrated in Section 3.

[2] More recently, within economics, there has been a realisation that efficiency wage theories naturally accommodate wage differentials as a motivating factor (see Summers, 1988, and Akerlof and Yellen, 1990). Furthermore, attempts have been made within the context of evolutionary game theory to provide a justification for the emergence of fairness norms from the basis of rational behaviour (see, for example, Binmore and Samuelson, 1994, and Rabin, 1993).

This paper presents an empirical assessment of the extent to which wage interactions reflect comparisons made by workers, as opposed to reflecting the 'fall-back' situation of workers if bargaining breaks down. Comparisons with others are commonly thought to be driven by 'fairness considerations', when individuals make interpersonal comparisons (of utility) and have 'empathetic preferences' (Binmore, 1994). Consequently, the results of this investigation can be interpreted as reflecting the importance of 'fairness' in wage setting.

'Fairness' is often connected with 'equity' (equal pay for equal work), a desire for which is often thought to motivate wage comparisons: "fairness, or equity, means the equality of reward/input ratios. Individuals assess themselves against 'comparison' others" (Carruth and Oswald, 1989, page 102). Comparisons could also be motivated by envy. Arguably, envy also involves interpersonal comparisons of utility, and hence, in a broad sense, 'fairness considerations'. For the purposes of this paper, whether comparisons are driven by equity or envy is a secondary consideration; the focus is whether such comparisons matter in wage determination.

The importance of comparisons is difficult to test empirically. It is hard to provide a rationale for the importance of one comparison rather than another. Because of the problem of identifying reference groups, comparison wages are often taken to be identical to workers' fall-back options, which makes it impossible to distinguish empirically fairness-influenced from pure bargaining models.

In this paper the task of identifying reference groups is facilitated by the use of disaggregated data from the UK chemicals industry during 1978–89.[3] There is plenty of industrial relations and anecdotal evidence that a dominant pay leader operated during the period of study, namely Imperial Chemical Industries (ICI). Pay leaders act as a focus for wage comparisons; they provide a likely 'reference' wage, but are unlikely to form a potential 'fall-back'

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[3]The dataset is described more fully in the Appendix.

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for workers. Whereas in the event of a breakdown in pay nego-
tiations workers might be able to find work at wages related to
average wages in the industry or locality, it is unlikely that they
could expect to obtain jobs at ICI, or jobs paying an equivalently
high wage. ICI's wage might form *part* of the fall-back, but *only
part*: other wages should also matter in determining the level of
the fall-back wage.

This distinction allows us to compare statistically the impact
of comparison and fall-back wages on pay determination. Econo-
metric results lend support to the hypothesis that a good part of
the influence of wages elsewhere stems from inter-group compar-
isons.

The structure of the paper is as follows. Section 2 briefly as-
sesses evidence for the influence of wage comparisons, emphasis-
ing the particular role of pay leadership in the chemicals industry.
Section 3 sets out a bargaining model of wage determination that
highlights the problem of distinguishing fairness-influenced from
pure bargaining models of wage setting, and provides a possible
solution focussing on the behaviour of pay leaders. Results are
presented in Section 4. Section 5 concludes.

2   Comparisons and pay leadership

There is a large quantity of survey and case-study evidence for
the importance of various types of wage-wage comparison.[4] The
discussion here is confined to facts relating to firms in the UK
chemicals industry during the 1980s, which are the focus of the
econometric work. The evidence will be shown to be consistent

[4] See, for example, Brown and Sisson (1975); Daniel (1976); Kessler (1983);
Rees (1993); Willman (1982); Wood (1978). Various terminology has been
used within this literature: relativities or differentials, reference groups, refer-
ents or comparators.

with the existence of pay leadership in the industry.[5]

Survey evidence concerning the importance of comparisons in the wage setting process in UK establishments, coinciding with the period of the present study, is provided by the CBI Pay Data-bank (see Gregory *et al*, 1985; 1986; Ingram, 1991). Where comparisons are important, it appears that settlers tend to have one main wage referent: over 1980–84, one third reported that only one comparison was very important, whereas only 15% considered two or more referents very important (just over half of settlements gave *no* wage comparison a 'very important' rating in any one pay round) (Gregory *et al*, 1985).

There are considerable differences across industries in the reported importance of comparisons. Comparability pressures "have regularly been strong among high settlers and weak among low settlers" (Gregory *et al*, 1985, page 352). The chemicals industry was unusual in being a high-settling industry yet being roughly in line with the average in terms of the reported importance of various foci of comparability pressures. But in terms of intra-industry dispersion, settlements in chemicals have been relatively concentrated; in manufacturing as a whole, settlements have shown a much larger increase in dispersion over time. This could be consistent with a relatively strong influence on wages in the chemicals industry from external comparisons.

The annual *Wages and Conditions Surveys* for the UK chemicals industry published by a major union in the industry, the General, Municipal, Boilermakers' & Allied Trades Union (GMB), provide evidence of explicit reference to settlements elsewhere in the economy in making judgements about the current settlement. The GMB *Surveys* often highlight large, multi-site, company-level settlements in the chemicals industry. The large settlements that

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[5]Theoretically, pay leadership is an *n*-bargaining group generalisation of the usual Stackelberg game, where one bargaining group acts as leader (ie taking the reaction functions of the other bargaining groups as given); the other bargaining groups act as followers, optimising against the leader's strategy.

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are mentioned are those of ICI (producer of a wide variety of general and specialised chemicals, paints and pharmaceuticals), Air Products, Associated Octel, and BOC Gases Division (all gases manufacturers and distributors), and Ilford and Kodak (photographic materials). Of these, ICI is cited most commonly, and is often thought to act as leader for wages and conditions within the chemicals industry (see Gill *et al*, 1978, for example).

There are many examples of ICI's leadership on pay and conditions. Turner (1956) reports that "ICI once left the chemical employers' federation on the question of its power to pay rates above its associates, and its present membership appears conditional on the retention of separate bargaining arrangements" (page 105). In 1969 the company introduced the path-breaking 'Weekly Staff Agreement' (WSA). In 1992, a new agreement on working practices, described by the GMB as "revolutionary", was negotiated between ICI and unions on the company's national negotiating committee, to replace the WSA. In return for a 14% wage rise, a decrease in standard weekly hours to 36 (from January 1993), 30 days' holiday per year, improved training and the "maintenance of the job security guarantee", the unions agreed to changing working practices. The impact of ICI's settlement is demonstrated by the GMB union's 'targets' for 1992 negotiations in other firms. The GMB's first priority was to aim for less than 38 hours a week and more than 25 days' leave a year: "One of our targets for 1992 must be to ensure that our members in other companies are not left behind in this [ICI's] move towards leisure time" (1992 *Survey*).

Although the evidence is consistent with ICI acting as pay leader in the UK chemicals industry, this is difficult to prove on the basis of the type of evidence examined in this section. We can get further towards proof by examining econometrically the relative influence of ICI's wage and other wage measures, as in Section 4. To reiterate the ultimate aim: by demonstrating the

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existence of pay leadership we also hope to show that pay elsewhere affects bargained wages because comparisons (relativities) matter, which may be driven by equity considerations.

3   The problem of distinguishing equity-influenced from pure bargaining models

The problem of distinguishing between pure bargaining models and those where fairness-influenced comparisons matter can be illustrated by a simple 'right-to-manage' model which highlights the different roles played by outside wages in the two types of model. If comparisons matter, the union cares about the excess wage it obtains for its members over and above some 'reference' (or 'fair') wage. The union's utility will be weakly increasing in the bargained wage W and weakly decreasing in the reference wage W^R. This can be represented by the general utility function:

$$\Omega(.) = \Omega(W; W^R). \tag{1}$$

where $\Omega_W > 0$ and $\Omega_{WR} < 0$.[6]

This utility function can be combined with the usual maximum profit function for the firm, where profit Π is a function of the wage W and employment N (both of which are endogenous) and is subject to the exogenous influences of the own product price P and technology A (a productivity shift parameter). Then the (symmetric) Nash bargaining problem is:

$$\max_W \left(\Omega(W; W^R) - \underline{\Omega}(.) \right) \left(\Pi(W, N; P, A) - \underline{\Pi}(.) \right), \tag{2}$$

where $\underline{\Omega}$ and $\underline{\Pi}$ are, respectively, the union's and firm's fall-back options. Employment is set by the firm: $N = N(W; P, A)$. This

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[6]The semi-colon indicates a conditional: variables to its right are treated as fixed, or exogenous.

can be substituted into (2). Then, representing $\Omega(W)$ by W and dropping exogenous determinants of profit for clarity, the wage is given by:

$$W = W\left(W^R, \frac{\Pi(N)}{N}, \underline{\Omega}, \frac{\Pi}{N}\right).$$ (3)

Just as in pure bargaining models, the wage appears to be a mark-up on the reference wage, the size of the mark-up depending positively on the firm's profit (or, equally well, revenue) per employee and the union's fall-back, and negatively on the firm's fall-back.[7]

The main problem in distinguishing models where fairness matters from pure bargaining models arises because the union fall-back $\underline{\Omega}$ (which represents workers' expected reward during a temporary stoppage) and the reference wage W^R are both usually assumed to reflect wages elsewhere in the economy.[8] In this case, outside wages would appear in the solution — and hence as a determinant of wages — whether or not equity-related comparisons are important. Where equity matters, however, in addition to their appearance as a determinant of the union's fall-back option, outside wages enter the bargaining problem because the union cares about wage differentials and the outside wage determines the wage differential for any bargained wage.

But the 'reference' wage W^R does not have to be (will generally not be) identical to workers' fall-back option $\underline{W}$, the 'outside' wage which workers expect to obtain through working elsewhere. It would be possible to distinguish the two rationales if there were some wage variable which might represent comparisons, but would

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[7]Denoting terms in (3) 1,2,3 and 4, the signs of the partial derivatives are: W_1, W_2, $W_3 > 0$; $W_4 < 0$.

[8]$\underline{\Omega}$ may also depend on the chance of employment — potentially affected by the unemployment rate, the ratio of vacancies to unemployment, the long-term unemployment rate, the replacement ratio, *etc.*

If workers' fall-back options are identical to the 'reference' wage W^R then, given the utility function (1), the first term in the Nash maximand (2) would be $\left(\Omega(W) - \underline{\Omega}(W^R)\right)$.

not normally be thought to capture workers' fall-back options. It was argued in Section 2 that the wage of a dominant, leading group could play such a role.

The fall-back wage can be defined as workers' expected wage if the current bargain breaks down:

$$\underline{W} = \sum_i \left\{ \begin{array}{c} \textit{probability of obtaining job at bargaining unit i} \\ \times \textit{wage at i} \end{array} \right\}$$

The set of wages in principle included in the fall-back for any given worker includes the wages at all firms where the worker puts a non-negligible probability on obtaining a job if the current negotiations break down. The probability of obtaining a job elsewhere is subjective and unobservable. If this probability is equal across bargaining units, the fall-back wage could be modelled as a simple average of wages elsewhere. But the probability of getting a job might be expected to vary across firms — in particular, in relation to employment. In this case, the fall-back can be modelled as an employment-weighted average of wages elsewhere. The empirical work of this paper makes use of unweighted and employment-weighted average wages as measures of fall-back, respectively W_{AV} and W_{AVN}. We also examine the influence of the industry regional average wage W_R. Workers' fall-back wages might well be an average of wages in their region if they face significant relocation costs, for example. The potential importance of comparisons within the locality is clear from survey and other evidence (for example, see the analysis of the CBI Pay Databank survey in Brown and Walsh, 1991, especially Table 4, page 52).[9]

Our empirical tests also investigate the influence of the median and modal wages. These might be more readily observable or com-

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[9]There are certain regions in which ICI, the likely pay leader, does not have a plant. If comparisons are made on a local basis, the importance of ICI as pay leader might differ across regions. Further investigation of pay setting at a regional level is beyond the scope of this paper.

putable proxies for a probability-weighted fall-back; alternatively, they might capture workers' idea of a 'fair' or reference wage. Because they have the potential to act in both roles, the median and modal wages cannot be used to assess whether the importance of wages elsewhere stems from comparisons or fall-backs. The ICI wage is the only measure that might act as a fair wage but not (on its own) as a fall-back.

4   Econometric results

This section uses bargaining unit-level data to compare the role of the wage of ICI, which is the dominant firm in the UK chemicals industry and might act as a pay leader, with alternative measures of external wages. The dataset consists of an unbalanced panel covering 321 unionised bargaining units in the industry over 1978-91 (see Appendix).

The form of the estimated equations is based on the type of bargaining model set out in Section 3: the real wage outcome in bargaining unit i, w_{it}, is modelled as a function of real wages elsewhere, the financial performance of the related company j (measured by lagged profits per employee) and the relative bargaining power of firm and union.

Several different measures of wages elsewhere are compared in the empirical work, as discussed in Section 3. Each alternative real wage measure is included separately (lagged and in natural logarithms) as the alternative wage measure (see Table 1).[10]

The firm's bargaining strength is hypothesised to be increasing in its holdings of inventories (per employee) at the beginning of the period, since they might reduce the costs to the firm of a strike

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[10] ICI settle in July — at the end of the August-to-July wage round. Most settlements occur between January and May, so it is ICI's wage for the previous year that will influence wage setting. Results are robust to the use of current-dated alternative wage measures, which might represent expectations.

(see Clark, 1991).[11] Union bargaining strength is increasing in the current ratio of vacancies to unemployment in the locality of the bargaining unit and inversely related to the current local unemployment rate. A greater proportion of long-term unemployed in the total might increase the bargaining power of 'insiders' (see, for example, Nickell, 1987). The capital-labour ratio is included to capture productivity trends or the firm-specificity of workers (which might increase their bargaining power). The equations also allow for unobserved effects that are specific to each bargaining unit and constant over time, and all potentially endogenous firm-level variables (indicated by ⌢ over the mnemonic) are instrumented with their own previous two lags. Estimation is conducted using LIMDEP.

The estimated equation is:

$$w_{it} = \alpha_{0i} + \underset{+}{\alpha_1} \widehat{(\pi - n)}_{jt-1} + \underset{+}{\alpha_2} \widehat{(k - n)}_{jt}$$
$$+ \underset{-}{\alpha_3} \widehat{(stk - n)}_{jt-1} + \underset{-}{\alpha_4} UR_{Rt} + \underset{+}{\alpha_5} (V/U)_{Rt} \qquad (4)$$
$$+ \underset{+}{\alpha_6} UR52_t + \underset{+}{\alpha_7} \ln (Alternative\ Wage)_{t-1} + \varepsilon_{it}.$$

where: α_{0i} capture unobserved bargaining unit-specific characteristics that remain constant over the sample period; $(\pi - n)_{jt-1}$ is lagged profits per employee at company j; $(k - n)_{jt}$ is the current capital–labour ratio; $(stk - n)_{jt-1}$ is the level of total stocks at the end of the previous period; UR_{Rt} is the rate of unemployment in the bargaining unit's region R; $(V/U)_{Rt}$ is the regional vacancy–unemployment ratio; $UR52_t$ is the aggregate proportion of long-term in total unemployment. Lower-case letters denote variables in natural logarithms. The signs of the predicted effects are shown under the relevant coefficients.

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[11] Alternatively, large inventory might indicate worse economic conditions than the firm had been expecting, which might induce the workforce to accept a lower settlement.

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Alternative Wage$_{t-1}$	[1] w_R	[2] w_{AV}	[3] w_{AVN}	[4] w_{MED}	[5] w_{MOD}	[6] w_{ICI}
$(\widehat{\pi - n})_{jt-1}$	0.0527 [3.44]	0.0318 [2.20]	0.0455 [3.02]	0.0314 [2.19]	0.0411 [2.74]	0.0431 [3.08]
$(\widehat{k - n})_{jt}$	0.0755 [2.53]	0.0621 [2.26]	0.689 [2.36]	0.0613 [2.24]	0.0742 [2.58]	0.0406 [1.47]
$(\widehat{stk - n})_{jt-1}$	−0.140 [−3.14]	−0.0958 [−2.32]	−0.105 [−2.38]	−0.0948 [−2.30]	−0.111 [−2.58]	−0.0818 [−1.99]
UR_{Rt}	0.787 [2.53]	0.775 [2.72]	0.552 [1.81]	1.241 [4.33]	1.172 [3.88]	1.024 [3.64]
$(V/U)_{Rt}$	0.0990 [0.57]	−0.0358 [−0.22]	0.0973 [0.53]	−0.0397 [−0.25]	−0.0757 [−0.45]	0.333 [2.13]
$UR52_t$	−0.562 [−4.60]	−0.312 [−2.88]	−0.258 [−1.85]	−0.336 [−2.85]	−0.332 [−2.59]	−0.327 [−2.78]
ln Alternative Wage$_{t-1}$	0.387 [6.34]	0.767 [8.49]	0.834 [6.22]	0.760 [8.70]	0.524 [7.22]	1.238 [8.82]
$\bar{R}^2$	0.882	0.901	0.889	0.902	0.891	0.903
F-test (111,323)	30.23	36.61	32.43	37.03	32.94	37.56
Log Likelihood	670.5	708.8	684.4	711.0	687.5	713.9
Autocorrelation Coefficient	-0.076	-0.045	-0.071	-0.034	-0.071	-0.012
Number of Observations	435	435	435	435	435	435
Number of Bargaining Groups	105	105	105	105	105	105

Table 1: Comparison of alternative wage measures, 1978–89

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Notes to Table 1:

(i) Dependent variable is real basic wage of lowest-grade worker (excluding canteen/cleaners) in bargaining group including production and general workers. Upper case letters refer to real-valued variables, lower case to natural logarithms.

(ii) *Alternative Wage*: w_R Regional industry average; w_{AV} Industry average; w_{AVN} Company employment-weighted industry average; w_{MED} Median; w_{MOD} Mode; w_{ICI} ICI wage.

(iii) Estimated by instrumental variables including individual-specific dummies. Where $\frown$ appears over mnemonic, variable instrumented with own second and third lags. Two years of sample (two observations per group) used as instruments. t-statistics in square brackets.

(iv) *F-test*: for joint significance of regressors and individual dummies.

(v) *Autocorrelation coefficient* = 1-DW/2, where DW is the Durbin-Watson statistic.

(vi) i: bargaining unit, $i = 1,...,321$. j: company, $j = 1,...,119$. R: region, $R = 1,...,11$.

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All measures of the alternative wage appear to positively affect bargained wages. As predicted by the bargaining model, a higher stock of inventories seems to enable the firm to hold down the wage. A higher capital-labour ratio results in a higher wage. When significant, the ratio of vacancies to unemployment has the expected positive coefficient. But other labour market variables do not have the effects predicted by bargaining models. The coefficient on the unemployment rate is significant and positive. This is not unprecedented — see Beckerman and Jenkinson (1990) and Nickell and Kong (1992), for example — and can be explained by compensating differentials arguments: workers may demand a premium for working in an area of high unemployment if unemployment has undesirable externalities (such as high crime), or if the probability of being made redundant is proportional to the level of unemployment in the local area. A higher long-term unemployment rate is associated with reduced real basic pay, which might suggest it captures worse economic conditions rather than greater insider power.

Non-nested tests can be used to compare the relative influence of the alternative wage measures (see Table 2). The tests used are J-tests (Davidson and MacKinnon, 1981): for dependent variable y and competing sets of regressors X and Z, y is regressed on X and fitted values obtained, then y is regressed on these fitted values and Z. If Z is the correct set of regressors, the coefficient on the fitted values from the X-regression should be close to zero (a t-test is used to determine whether this is so). This procedure is then reversed; the set of regressors Z is preferred only if the results of the reverse procedure are consistent.

Although the ICI wage clearly forms part of the fall-back measures based on full sample averages, there is no identification problem: the influence of the ICI wage as 'fair' wage can be readily distinguished from its part in the fall-back, as the fall-back measures include wages at other bargaining units that are not at all

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in regression including:	t-statistic on fitted values from regression including:					
	w_R	w_{AV}	w_{AVN}	w_{MED}	w_{MOD}	w_{ICI}
w_R	⋱	5.57* [0.000]	3.83 [0.000]	5.87* [0.000]	4.67* [0.000]	6.27* [0.000]
w_{AV}	1.31 [0.190]	⋱	0.49 [0.628]	1.87* [0.063]	0.91 [0.362]	2.86* [0.004]
w_{AVN}	4.49* [0.000]	5.90* [0.000]	⋱	6.28* [0.000]	4.58* [0.000]	6.32* [0.000]
w_{MED}	1.14 [0.254]	−0.75 [0.456]	0.90 [0.366]	⋱	0.47 [0.638]	2.31* [0.021]
w_{MOD}	3.23 [0.001]	4.29* [0.000]	2.06 [0.040]	4.63* [0.000]	⋱	5.25* [0.000]
w_{ICI}	2.08 [0.038]	1.80 [0.073]	0.42 [0.672]	2.01 [0.045]	2.11 [0.036]	⋱

Table 2: J-tests comparing alternative wage measures

Notes to Table 2:
(i) 'Alternative wage' measures are lagged once.
(ii) Probability that t-value is greater than coefficient given in square brackets under the relevant t-statistic.
(iii) Dominance of particular outside wage measure requires t-statistic in relevant *column* to be higher than its mirror image (when reflected in main diagonal). * indicates dominance in such comparisons.

highly correlated with ICI's wage. Indeed, the correlation between ICI's wage and those of other bargaining units in the full sample is only 0.3.[12]

On balance, the results suggest that the ICI wage is more influential than other measures of the alternative wage. Although comparisons of ICI's wage with the regional, median and modal measures are inconclusive at conventional significance levels, the relative size of the t-statistics reported in Table 2 — which can be used as an indicator of 'dominance' — suggests that ICI's wage is the more influential. The preferred measures of fall-back wages have relatively little influence on wage setting. Perhaps surprisingly, the employment-weighted average wage is the least influential (it is dominated by all other measures). The regional average is dominated by all 'alternative wage' measures except this employment-weighted average. The unweighted average measure is dominated by the ICI wage and the median. In contrast, *the ICI wage dominates in every case.*

The same conclusion results from nested tests in which the ICI wage is included along with each alternative wage measure in turn (see Table 3). Arguably, the inclusion of the 'reference' or 'fair' wage *in addition to* the 'fall-back' wage is recommended by equation (3). Although collinearity might affect the estimates, the dominance of ICI's wage appears robust (in practice, coefficients other than the alternative wage are largely unchanged). The 'fall-back' wage can be rejected, its coefficient being indistinguishable

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[12]ICI has equal weight with the hundreds of other bargaining units in the unweighted average wage, and has a weight of 7% (equal to its share of company employment) in the weighted measure of the fall-back. ICI bargained on a company-wide basis during the period of study. Although other bargaining units are owned by large companies, many operated plant-based bargaining; for these groups, there is a substantial difference between employment at bargaining unit and company levels. As a consequence, ICI is relatively large in terms of bargaining unit employment, accounting for an average of 22% of bargaining unit employment.

Statistics relating to:		Statistics from regression including w_{ICIt-1} and the following alternative wage measure:				
		w_R	w_{AV}	w_{AVN}	w_{MED}	w_{MOD}
Alternative Wage	*coef* [t]	0.136 [1.94]	0.322 [1.69]	0.075 [0.42]	0.375 [1.89]	0.191 [1.98]
	Wald (p)	3.77 (0.052)	2.87 (0.090)	0.17 (0.678)	3.56 (0.059)	3.92 (0.048)
w_{ICIt-1}	*coef* [t]	1.022* [5.72]	0.789* [2.64]	1.177* [5.81]	0.691* [2.15]	0.957* [4.82]
	Wald (p)	32.74* (0.000)	6.97* (0.008)	33.74* (0.000)	4.61* (0.032)	23.18* (0.000)

Table 3: Nested comparison of alternative wage measures

Notes to Table 3:

(i) The lagged natural log of ICI's wage, w_{ICIt-1}, is included along with the lagged natural log of each alternative wage measure in turn in equation (4).

(ii) The following statistics are reported for the two wage measures included in each regression: Coefficient estimate and associated t-value (* indicates dominance); Wald statistic (distributed χ_1^2) for test of restriction that coefficient equal to zero, and associated p-value (* indicates dominance).

from zero, in four cases — the unweighted and weighted averages and the regional and median measures — and with only slightly less confidence in the case of the modal wage.

These striking findings are strongly supportive of the idea that wage-wage comparisons are important. The wages of a firm that is widely recognised as a leader in terms of pay and conditions have a larger effect on wage determination in other bargaining units in the industry than reasonable measures of the fall-back wage.

5   Conclusions

This paper has examined whether comparisons made by the workforce lie behind the importance of wages elsewhere in wage determination, or whether the apparent interactions reflect unions' fall-back options in the bargaining process. The difficulty of distinguishing these hypotheses was shown in the context of a 'right-to-manage' bargaining model. Many of the wages elsewhere that appear to influence wage bargaining could perform a dual role: they might form 'reference wages', but, equally, they might constitute part of workers' expected income if negotiations were to break down. Their use as measures of comparisons (or 'fairness') is indistinguishable from their role as fall-back options.

It was argued that possible measures of 'comparison wages' can be identified, in the form of wages at a dominant firm in an industry. Dominant firms might act as 'pay leaders', but because they could not provide employment for all workers in another firm, their wages would be a more imperfect representation of fall-back wages than, for example, average wages in the industry or location.

The hypotheses were examined in the context of the UK chemicals industry. The relative influence of the wage of ICI, a recognised pay leader, was compared with that of other alternative wage measures likely to act as fall-back wages for firms in the indus-

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try. The empirical work used a unique panel of data covering 321 unionised bargaining units in the UK chemicals industry between 1978 and 1989. Results were strongly indicative of pay leadership operating in the industry, confirming widespread industrial relations and anecdotal evidence of the importance of this type of wage comparison. The results demonstrate that wage interactions are affected by what might broadly be termed 'fairness' considerations and do not simply reflect the influence of workers' fall-back options.

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Appendix

The dataset used was collated by the author and matches bargaining groups and companies in the UK chemicals industry with local and aggregate labour market variables. Bargaining unit data are taken from the annual *Wages and Conditions Surveys* of the General, Municipal and Boilermakers' Union (a major union in the UK chemicals industry), Incomes Data Services *Reports* and Industrial Relations Services *Pay and Benefits Bulletins* (IDS and IRS are UK pay research bodies). Company data are taken from Extel Financial Company Accounts and Kompass *Company Directories*.

W_{it}: Basic wage of lowest-grade worker (excluding canteen workers and cleaners) in the bargaining group covering production and general workers; W_{Rt}: Regional average wage; W_{AVt}: Cross-section average wage; W_{AVNt}: Company employment-weighted cross-section average wage; W_{MEDt}: Median wage; W_{MODt}: Modal wage; W_{ICIt}: ICI wage.

Π_{jt}: Company pre-tax profit.

N_{jt}: Company employment. 'Domestic employment' where available, otherwise 'Total employment'. Until July 1982 companies were required to disclose only the number of UK employees. After this date, group totals are reported. Main results are unchanged when estimation is restricted to 1982 or 1983 onwards (results available from the author on request).

STK_{jt}: Company total stocks (inventories).

UR_{Rt}: Regional unemployment rate, from CSO *Economic Trends*, Table 21: Regional unemployment rates.

$UR52_t$: Male and female long-term unemployment divided by total unemployment, from CSO *Monthly Digest of Statistics*, Table 3.9: Unemployed in United Kingdom – analysis by duration and Table 3.10: Unemployment.

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$(V/U)_{Rt}$: Regional ratio of vacancies to unemployment, from CSO *Monthly Digest of Statistics*, Table 3.11: Unemployment – analysis by standard regions and Table 3.12: Vacancies at Jobcentres and career offices – analysis by standard regions.

All variables deflated by retail price index excluding mortgage interest payments (from CSO *Economic Trends*, Table 26: Prices) except the regional average wage which is deflated by regional price indices excluding housing costs (from The Reward Group *Cost of Living Report: Regional Comparisons*, Table 7C: Regional indices – consumer prices).

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