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Wages and concentration in British manufacturing

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I. INTRODUCTION

In a recent paper, John Kwoka Jr examined the effects of industry concentration, plant size and unionization on the wages of blue collar workers in US manufacturing. He criticized earlier studies that had investigated the relationship between wage rates and the structure of labour product markets for 'deficiencies in model specification and problems of variable measurement' which he argued 'have not produced altogether consistent results (1983, pp. 251–7). He argued persuasively, that because plant size, concentration and unionization are likely to be interrelated, their effects on wages will only be disentangled if these variables are included separately in a wage equation, along with an interaction term between concentration and unionization and a vector of labour quality variables. The interaction term is included to test for the possibility that union relative wage effects are greater, the greater the degree of concentration (see Lewis, 1963, p. 160). The labour quality variables are included to allow for the possibility that the monopoly wage effect is, in part, a result of the higher quality of workers in concentrated industries (see Weiss, 1966, pp. 96–117).

Using data on 250 blue collar workers in US manufacturing,[1] Kwoka showed that wages are significantly higher in large plants, under union contracts and in concentrated industries, even in the presence of labour quality variables.[2] The effects of concentration were 'the least consistent' of the phenomena reported, hence Kwoka included an excess profits variable to measure any additional profit not explained by concentration and other influences. This had the effect of 'measurably strengthening the statistical significance of both concentration and its interaction with unionisation' (Kwoka, 1983, p. 257).

This paper reports on an attempt to test the applicability of Kwoka's propositions to skilled and semi-skilled manual workers in British manufacturing in 1980, using data at the level of the establishment. There are a number of important differences between the United States of America and Great Britain which made direct comparisons between the two sets of results very

[1]The data were taken from the 1977 *Quality of Employment Survey* and included 250 blue collar workers over the age of 16 employed in US manufacturing for at least 20 hours per week.
[2]The concentration/unionization interaction term had a negative sign and was only significant at the 10% level on a one-tailed test.

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difficult. The most obvious difference is in the size of the two countries; a small market such as Great Britain is likely to be able to support fewer optimally sized plants than a country such as the USA, where for a given size of plant the level of plant concentration would be much lower.[3] Hence, by virtue of its smaller market, an equivalent British industry tends to be more highly concentrated than its American counterpart, and thus the average level of concentration tends to be greater in Great Britain than in the United States (Shepherd, 1972). Offsetting this, however, is the sensitivity of British manufacturing to overseas competition, and the rapid decline it has experienced over the last decade. Indeed, since 1975 it has lost around 2 million workers or around 25% of its total workforce.

Compared with the USA, a considerably higher proportion of workers in Great Britain are members of a trade union: in 1980, 62% of all full-time workers were union members as were over 90% in the public sector and 68% in private manufacturing.[4] Collective bargaining in Great Britain is widespread (although there is considerable diversity in its form), with negotiations taking place at a number of different levels. In many industries there is machinery at national or industry level which brings together representatives of employers' associations and full-time officers of trade unions. In private industry substantive agreements at national or industry level tend to set minimum terms and conditions of employment (ACAS, 1980). The items covered vary widely from industry to industry, but usually include minimum rates of pay, premia for calculating payments for overtime and shiftwork, normal hours of work and holiday entitlements. (In some industries, minimum terms and conditions are determined by statutory bodies with statutory force.) Bargaining at company level, covering all the establishments of a multi-plant company, or at a plant or establishment level, covering a single site within a company, is widespread.[5] At workshop level, bargaining is generally over detailed conditions of employment such as the allocation of work arrangements for overtime etc.

II. PREVIOUS STUDIES IN GREAT BRITAIN

There are some precedents in the UK literature for the inclusion on the right-hand side of a wage/earnings equation, of a concentration variable as an indicator of product market power. Examples of such are Sawyer (1973), Hood and Rees (1974), Mayhew (1976), Mulvey (1976), Wabe and Leech (1978), Hart and Clarke (1980), Clarke (1983) and Stewart (1983a). At the same time there are also some precedents for the inclusion of a unionization/coverage variables, for instance, Pencave (1974), Mulvey and Foster (1976), Layard *et al.* (1978), Mulvey and Abowd (1980) and Blanchflower (1984b). Very few of these studies have included both variables. Table 1 reports the findings of those studies which estimated wage equations while including (at least) a concentration variable. With only one exception the data used were at a highly aggregated level

[3] The most comprehensive analysis of differences in international market structure is that of Bain (1966).
[4] These figures were taken from Daniel and Millward (1983, p. 18) and Freeman and Medoff (1979, pp. 143–74). The latter report that 49% of production workers in US private manufacturing (1973–5) were union members.
[5] A number of studies have reported the rise of single-employer bargaining in manufacturing in the 1970s. See Brown (1981, Ch. 2) and Daniel and Millward (1983, Ch. 8).

Table 1. *Summary of models and results*

Study	Plant size	Concentration	Unionization	Concentration and unionization	Labour quality
Sawyer (1973)	0	0			*[g]
Hood and Rees (1974)	+	−	+[a]	0	*[g]
Mulvey (1976)	0	0	+		*[g]
Wabe and Leech (1978)	0	0	0		*[g]
Hart and Clarke (1980)		+	+		*[g]
Clarke (1983)		0[b]	0		*[g]
Stewart (1983a)[c]	+[e]	0	+[f]		*
Stewart (1983a)[d]	+[e]	+	0[f]		*

[a]Variable used is the annual number of days lost through strikes per thousand workers 1960–3.
[b]Dummy variable included when concentration $> 40\%$ as well as its interaction with the concentration variable.
[c]Union equation.
[d]Nonunion equation.
[e]Three plant size dummies included when employment was in the ranges 25–99, 100–499 and 500 +. Only the last two had significant effects.
[f]The proportion of male manual workers in the individual's MLH who are union members. (The proportion covered by collective agreements was also included but found to be insignificant in both equations.)
[g]Abbreviated list of quality variables included.
+ indicates a positive significant effect.
− indicates a negative significant effect.
0 indicates the variable was included with no significant effect.
Blank indicates the variable was not included.

and contained little information on labour quality differences. Moreover, where (average) plant size data were available, there was frequently a problem of collinearity between this and the concentration variable. Hence, there are few examples of wage equations that include plant size, concentration *and* unionization variables.

As can be seen from Table 1, only Stewart (1983) had data at a sufficiently disaggregated level to permit the inclusion of a detailed group of quality variables, in addition to the plant size, unionization and concentration variables. Only Hood and Rees (1974) included an interaction term between concentration and unionization and it was found to have an insignificant coefficient.

The evidence from the studies reported in Table 1 is mixed, unlike that reported by Kwoka (1983) for the United States where virtually all studies showed wage increasing effects of plant size and unionization. The effect of concentration in US studies was less definite, being divided roughly half and half between those that found significant positive effects and those that found no significant effects at all. In the case of Great Britain there seems to be very little agreement over the significance of *any* of the variables in explaining workers' wages. This is in some degree a result of inconsistencies in the sample of industries included and/or the vector of quality variables used. Recent work by Geroski and Stewart (1982) suggests that the size and

significance of the coefficients on the plant size, concentration and unionization variables is highly sensitive to such differences. It is also, to some extent, a result of the use of very different measures of unionization. Hood and Rees (1974) used the number of working days lost through strikes per thousand employees, which is a measure of union activity rather than of union power.[6] Stewart (1983a) estimated union and nonunion wage equations based upon union membership, whereas the remaining studies used the proportion of workers in an industry covered by collective agreements (Mulvey, 1976; Wabe and Leech, 1978) or its inverse, the proportion not so covered (Hart and Clarke, 1980; Clarke, 1983). The paper utilizes a new and preferable measure of unionization – the recognition of manual unions at the workplace for purposes of bargaining over pay and conditions.

III. DATA AND DESCRIPTION OF VARIABLES

The data set used in this paper is the 1980 *Workplace Industrial Relations Survey* (henceforth *WIRS*) sponsored by the Department of Employment, Policy Studies Institute and the Social Science Research Council, based on a representative sample of 3309 working establishments distributed throughout England, Scotland and Wales defined as places of employment at a single address or site. The sample was drawn from the 1977 *Census of Employment*; to be included in the sample an establishment had to have 25 or more employees (both full- and part-time) at the time of the 1977 Census *and* at the time of survey (April–September, 1980). Hence, new establishments and those whose size increased from below 25 to above 25 and those that declined below 25 employees between 1977 and 1980 were excluded from the sample. (For further details see Daniel and Millward, 1983; Blanchflower, 1984a and b) Of the 2040 establishments in the sample, this paper focuses on a sample of 519 establishments in the manufacturing sector in the case of semi-skilled manual workers and 516 in the case of skilled manual workers.

WIRS is a multi-respondent survey with interviews conducted with at least the senior manager at the establishment who dealt with industrial relations and, at most, with two management and three employee representatives. Around 40% of all questions in the survey were asked of both management and worker representatives, but only the former group were questioned on pay levels and it is from their responses that *all* variables are derived.

Management respondents were asked to identify the gross (weekly) pay of 'typical' employees for four separate skill groups (two manual and two nonmanual). This question was intended to ensure the high response rate which it seems to have achieved. A major disadvantage, however, is that the wage data are broad banded across nine classes and open-ended at both ends. Arithmetic mid-points are somewhat arbitrarily allocated to the internal groups as £30 and £200 for the lower and upper classes (which were under £50 and over £160), respectively. Stewart (1983b) has criticized this method of allocating values to observations and argues that it results in inconsistent estimates. He advocates the use of a two-step estimator to assign each observation the conditional expectation $E(y_i | A_{k-1} < y_i \leqslant A_k)$ where y_i is the unobserved dependent variable and A_k and A_{k-1} are the upper and lower bounds of the kth range of the

[6] Hart and Clarke (1980, p. 85) also used this measure in one of their specifications.

logarithm of earnings respectively. When this methodology was applied it produced virtually identical results to those reported here.

The use of weekly earnings rather than hourly earnings has been criticized by Metcalf (1977) because 'it is hourly earnings which indicate the opportunity set (income and leisure) facing the individual: weekly earnings comprise the choice of hours given the opportunity set and the opportunity set itself . . . From the firm's point of view it is hourly earnings which determine its production costs: weekly earnings reflect the firm's choice between men and hours and do not measure the underlying labour costs'.

Metcalf *et al.* (1976) estimated that unionized male workers supplied approximately two hours less per week than nonunion workers for 1966. Although there is no way of confirming these findings because of the unavailability of hours data in *WIRS*, if this pattern has continued into the 1980s, then an underestimation of the impact of unions will be obtained.

IV. EMPIRICAL ANALYSIS

As in Kwoka (1983) a number of variables are included to represent differences in industry structure. Plant size (*TOTAL*) is recorded in *WIRS* as a continuous variable. Recognition (*REC15*) is a dummy variable equal to 1 if the establishment recognizes at least one manual trade union for purposes of collective bargaining. Both of these variables are available from *WIRS*, as is the industry to which the establishment belonged, at an intermediate level of aggregation. Concentration data were obtained from the 1977 *Census of Production*, with each establishment being allocated the proportion of value added accounted for by the five largest enterprises in the industry (*CR5*). An interaction term between concentration and unionization (*CRU*) was also included.

In addition, a group of workforce and workplace characteristics were also included as control variables.[7] They were as follows:

(*PARTE*)	The percentage of the workforce that works part-time, i.e. less than 30 hours per week.
(*MANE*)	The percentage of manual workers in the workforce.
(*FEMMANE*)	The percentage of manual workers that is female.
(*SKILLED*)	The percentage of the workforce that received formal training (apprenticeship or equivalent).
(*FOREIGN*)	A (1, 0) dummy if the establishment is foreign owned.
(*BLACK*)	The percentage of the workforce of Asian, African, West Indian or similar origin.
(*EXTENT*)	The percentage of manual workers in unions in the industry into which the establishment is classified (by principal product).
(*SHIFT*)	A (1, 0) dummy if there is any shift work at the establishment.
(*NMANPRES*)	The number of unions that have members among manual employees at the establishment.

[7]Blanchflower (1984b) contains a more detailed discussion of the reasons for the inclusion of these variables in a wage equation at the level of the establishment.

(*OUTW*)	A (1,0) dummy if the establishment uses outworkers.
(*LTDCO*)	A (1, 0) dummy if the establishment is a limited company.
(*SHARES*)	A (1,0) dummy if the establishment has a share ownership scheme.
(*PJEVAL*)	The percentage of workers covered by job evaluation schemes.
(*PBR1*)	A (1,0) dummy if the establishment pays the majority of its male unskilled/semi-skilled employees by results.
(*PBR2*)	A (1,0) dummy if the establishment pays the majority of its female unskilled/semi-skilled employees by results.

Table 2 presents simple correlation coefficients between plant size, concentration, union recognition and interaction variables. In part A of the table, the results for manual workers in British manufacturing are reported; part B shows the comparable correlations provided in Kwoka (1983) for blue collar workers in United States manufacturing. It is immediately apparent how much lower are the correlation coefficients in part A, compared to those in part B. In particular, the simple correlation coefficients reported, between the unionization/recognition variables and the plant size and concentration variations are insignificantly different from zero

Table 2. *Simple correlation coefficients*

A. Manual workers (skilled and semi-skilled) in Great Britain

	CR5	*REC15*	*CRU*[d]
TOTAL[a]	0.253***	0.194	0.333***
CR5[b]		0.046	0.576***
REC15[c]			0.750***

[a]*TOTAL* = number of employees at the establishment.
[b]*CR5* = proportion of value added in the industry accounted for by the largest five enterprises.
[c]*REC15* = recognition of a manual union at the establishment for purposes of bargaining.
[d]*CRU* = interaction term between *CR5* and *REC15*.

B. Blue collar workers in the United States

	CR4	*UN*	*IMCR4*
PLS[a]	0.42***	0.31***	0.45***
CR4[b]		0.33***	0.75***
UN[c]			0.80***

[a]*PLS* = plant size measured in 7 discrete groups.
[b]*CR4* = 4-firm concentration ratio at the 3-digit level.
[c]*UN* = (1,0) dummy to identify an individual's union status.
[d]*UNCR4* = interaction term between *UN* and *CR4*.
Source: Kwoka (1983) p. 255.
*** significant at the 1% level.

in Great Britain but highly significant in the United States. (Moreover the latter coefficient for the United States is over seven times larger than that for Great Britain.) Kwoka has argued that the correlation coefficients reported in part B of Table 2 showed such 'high levels of significance . . . confirm beyond any doubt the joint occurrence of these industrial and labour market characteristics' (1983, p. 255). Evidence provided in part A of Table 2 suggests that there are some doubts about the joint occurrence of these industrial and labour market characteristics amongst manual workers in British manufacturing. These doubts are further substantiated in Tables 3 and 4, which present the results of regressing the gross weekly earnings of the 'typical' semi-skilled and skilled manual employee respectively, on the 'industry structure' variables, both

Table 3. *Regression of the gross weekly earnings of the 'typical' semi-skilled employee*

Equation	1	2	3	4	5
TOTAL	0.00003***	—	—	0.00002*	0.00002*
	(3.11)			(1.80)	(1.71)
REC15	—	0.1193***	—	0.1071***	0.0852
		(4.68)		(4.16)	(1.54)
CR5	—	—	0.00179***	0.00138**	0.0010
			(2.91)	(2.21)	(0.94)
CRU	—	—	—	—	0.0058
					(0.45)
PROFIT	—	—	—	—	—
QUALITY	—	—	—	—	—
$\bar{R}^2$	0.01726	0.03745	0.01371	0.0529	0.0515
F	9.693	21.89	8.465	11.00	8.29
n	519	519	519	519	519

Equation	6	7	8	9	10	11
TOTAL	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
	(1.17)	(1.23)	(1.31)	(1.01)	(1.34)	(1.39)
REC 15	−0.0026	0.0113	0.0111	−0.1116**	−0.00633	−0.00668
	(0.05)	(0.48)	(0.47)	(2.10)	(0.28)	(0.30)
CR5	−0.00009	0.00016	—	−0.0017*	0.00008	—
	(0.10)	(0.28)		(1.66)	(0.13)	
CRU	0.00004	—	—	0.0026**	—	—
	(0.34)			(2.18)		
PROFIT	—	—	—	−0.0103**	0.00957**	−0.00948**
				(2.15)	(2.00)	(2.00)
QUALITY	√	√	√	√	√	√
$\bar{R}^2$	0.4276	0.4280	0.4300	0.3852	0.3840	0.3880
F	21.37	22.59	23.96	15.92	16.44	17.51
n	519	519	519	496	496	496

***significant at the 1% level on a two-tailed test.
**significant at the 5% level on a two-tailed test.
*significant at the 10% level on a two-tailed test.
t-statistics in parentheses.
√a vector of 'quality' variables included.

Table 4. *Regression of the gross weekly earnings of the 'typical' skilled employee*

Equation	12	13	14	15	16
TOTAL	0.0002**	—	—	0.0002*	0.0002*
	(2.24)			(1.90)	(1.73)
REC15	—	0.04912**	—	0.0344*	−0.00474
		(2.44)		(1.70)	(0.11)
CR5	—	—	0.00196**	0.00163***	0.0009
			(4.08)	(3.28)	(1.07)
CRU	—	—	—	—	0.00108
					(1.03)
PROFIT	—	—	—	—	—
QUALITY	—	—	—	—	—
$\bar{R}^2$	0.0256	0.00916	0.0285	0.0391	0.0392
F	5.02	5.94	16.65	8.23	6.44
n	516	516	516	516	516

Equation	17	18	19	20	21	22
TOTAL	0.00009	0.00009	0.00001	0.00001	0.0001	0.0001*
	(0.94)	(1.03)	(1.41)	(1.42)	(1.44)	(1.69)
REC15	−0.0197	0.0014	0.0002	−0.0261	−0.02501	−0.0305
	(0.50)	(0.08)	(0.00)	(0.55)	(1.24)	(1.57)
CR5	0.00054	0.00095*	—	0.00054	0.00056	—
	(0.64)	(1.85)		(0.57)	(1.00)	
CRU	0.00059	—	—	0.00003	—	—
	(0.61)			(0.03)		
PROFIT	—	—	—	−0.0107**	−0.0103**	−0.00884**
				(2.37)	(2.15)	(2.27)
QUALITY	√	√	√	√	√	√
$\bar{R}^2$	0.1832	0.1842	0.1802	0.1767	0.1784	0.1840
F	7.08	7.46	7.66	6.56	6.93	11.12
n	516	516	516	493	493	493

***significant at the 1% level on a two-tailed test.
**significant at the 5% level on a two-tailed test.
*significant at the 10% level on a two-tailed test.
t-statistics in parentheses.
√ a vector of 'quality' variables included.

with and without the 'quality' variables, whilst the Appendix contains the full set of results. (Table 5 presents Kwoka's results once again for purposes of comparison.) In all cases when *TOTAL*, *REC15* and *CR5* are included, singly or collectively, they have coefficients that are significant at the 10% level or better on a two-tailed test. Their significance falls when the interaction term *CRU* is included, although *CRU* has an insignificant coefficient in virtually every specification tried. When the 'quality' variables are introduced in Equations 6–8 in Tables 3 and Equations 17–19 in Table 4, only the coefficient in the *CR5* variable in Equation 18 for skilled manual workers remains significant.

Table 5. *Blue collar workers in the US (n = 250)*

Equation	23	24	25	26	27	28	29
TOTAL	0.0745***	—	—	0.0513***	0.0640***	0.0528***	0.0501***
	(5.27)			(3.58)	(3.17)	(3.69)	(3.13)
UN	—	0.2451***	—	0.1943***	0.4601***	0.3006***	0.3229***
		(5.95)		(4.70)	(3.77)	(3.48)	(3.24)
CR4	—	—	0.380***	0.1546	0.6334**	0.3723**	0.4484**
			(3.64)	(1.49)	(2.38)	(1.99)	(2.08)
UNCR4	—	—	—	—	−0.5554*	−0.3004	−0.3858
					(1.80)	(1.40)	(1.60)
RENTS	—	—	—	—	—	—	−0.4611
							(1.50)
QUALITY	√	√	√	√	√	√	√
R^2	0.628	0.639	0.600	0.676	0.226	0.679	0.692
F	19.1	20.20	17.14	20.86	15.83	20.02	17.43

***significant at the 1% level on a two-tailed test.
**significant at the 5% level on a two-tailed test.
*significant at the 10% level on a two-tailed test.
t-statistics in parentheses.
√a vector of 'quality' variables included.
Source: Kwoka (1983).

An estimate of the union/nonunion wage differential may be derived from the coefficient on the recognition variable. The size of this differential declines considerably once the 'quality' variables are introduced, with the extent of this decline being greatest in the case of the semi-skilled.[8] (For semi-skilled manuals the differential was estimated at 12.67% in Equation 2 and 1.14% in Equation 7 once 'quality' variables are included. For skilled manuals the differentials were 5.03% and 0.14% respectively from Equations 13 and 18.) These estimates are considerably smaller than those derived from previous studies which used aggregate data and appear to have suffered from serious omitted variable bias.[9]

Owing to the possibility that high wages 'result directly from high profits, whenever found, rather than indirectly from the underlying structural influence of concentration', Kwoka (1983, p. 256) included an additional variable (*RENTS*), calculated for each industry from a previous structure–performance study by the same author.[10] This was intended to pick up any additional profit not explained by concentration. As can be seen from Equation 29, however, the coefficient of this variable was insignificant, although its inclusion slightly improves the performance of the *CR5* and *CRU* variables. The rate of return on capital employed, in the industry in which the establishment was located, was included as an additional variable (*PROFIT*) to test for these effects in Great Britain. The results are reported as Equations 9–11 in Table 3 for semi-skilled manuals and as Equations 20–22 in Table 4 for skilled manuals.[11] This approach was selected rather than attempting to net out the effects of causal variables including market concentration, because the evidence from the few previous studies that have examined the relationship between concentration and profitability in Great Britain, is highly equivocal. In these circumstances it seems preferable to include a direct measure of monopoly power, the rate of return on capital employed, to determine whether high profits *whenever* they occur, result in higher wages.

The inclusion of the *PROFIT* variable in Equation 9 for semi-skilled manuals results in the coefficients of the *REC15*, *CR4* and *CR5* becoming significant (the former two at 5% and the latter at 10%): the coefficients of the *REC15* and *CR5*, however, declined considerably in contrast to the results for the United States reported by Kwoka as Equation 29. Indeed, taken at the mean level of the interaction variable (30.30), both the concentration and recognition variables have negative effects, which are rather unlikely. When the interaction variable was omitted, however, the significance of the concentration and recognition variables disappeared. In contrast, the addition of the *PROFIT* variable to the skilled manual equation reduces the size and significance of the concentration variable, with minor effects on the other coefficients. For both skill groups the coefficient of the *PROFIT* variable has a negative sign, which is significant at 5%. It is uncertain whether this relationship appears because workers are able to obtain higher wages where there are potentially high profits causing rates of return to be lower than

[8] The union/nonunion wage differential or wage gap may be calculated as $100\ (e^B - 1)$ where B is the coefficient on the recognition variable *REC15*

[9] For a summary of previous estimates in Great Britain, see Blanchflower (1984b).

[10] *RENTS* is calculated by Kwoka (1979) by 'netting against the price–cost margin the estimated effect of all causal variables including market concentration'.

[11] Data are unavailable for the textile industry hence these (23) cases were omitted when *PROFIT* was included. I am grateful to John Cubbin of Queen Mary College for providing the data from the UK Quoted Company Accounts Databank.

they would otherwise be, or if high rates of return result from paying low wages; the evidence presented here is consistent with both explanations.

V. CONCLUSIONS

The results reported in this paper are similar to those reported by Weiss (1966) for individuals in manufacturing, construction and mining in the United States in 1959. Weiss found that the significance of plant size, concentration and unionization variables disappeared when labour quality variables are introduced.[12] He concluded that concentrated industries pay higher wages, but in return obtain superior quality, i.e. more productive, labour: hence he concluded that these higher earnings were not monopoly rents. Although not dealt with specifically by Weiss, the decline in the size and significance of the coefficients on the plant size and unionization variables might have been explained using a similar argument.

In the case of larger plants, the evidence presented here is consistent with the view that the higher wages paid are, at least in part, compensating differentials for certain conditions of work such as the presence of shift systems (a highly significant variable in this study) and a more structured work setting. Considerable division of labour in large plants makes it more difficult for managers to organize production, consequently in comparison with small plants more formal rules and higher standards of dependability are required. Thus, plants of different sizes will normally set different standards for their workers, with the highest standards of dependability in the largest plants.

[12] Weiss did not have unionization data at the level of the individual and measures union power as the percentage of employees in establishments where more than half of productive workers are covered by collective bargaining agreements. See Lewis (1983) for a criticism of this approach.

APPENDIX

Wage equations for semi-skilled manual workers

Equation	6	7	8	9	10
PARTE	−0.006***	−0.006***	−0.006***	−0.0030**	−0.0027**
	(6.55)	(6.56)	(6.58)	(2.57)	(2.56)
MANE	0.0023***	0.0024***	0.0024***	0.00143**	0.00169***
	(3.44)	(3.51)	(3.50)	(2.32)	(2.67)
FEMMANE	−0.0043***	−0.0044***	−0.0043***	−0.0047***	−0.0049***
	(8.15)	(8.29)	(8.34)	(8.61)	(8.94)
REC15	−0.0026	0.0113	0.0111	−0.1116**	−0.0063
	(0.05)	(0.48)	(0.47)	(2.10)	(0.28)
LTDCO	0.1060**	0.1045**	0.1050**	0.1030	0.1040
	(2.17)	(2.15)	(2.17)	(0.13)	(0.15)
SKILLED	−0.0015***	−0.0015***	−0.0015***	−0.0013**	−0.0015**
	(3.22)	(3.31)	(3.45)	(2.64)	(2.59)
TOTAL	0.00001	0.00001	0.00001	0.00001	0.00001
	(1.17)	(1.23)	(1.31)	(1.01)	(1.34)
FOREIGN	0.040	0.040	0.040	0.046	0.042
	(1.30)	(1.29)	(1.30)	(1.59)	(1.43)
BLACK	−0.001	−0.001	−0.001	−0.0086**	−0.002**
	(1.31)	(1.31)	(1.31)	(2.56)	(2.42)
EXTENT	0.00178**	0.0018**	0.00185**	−0.0002	−0.0002
	(2.22)	(2.20)	(2.49)	(0.26)	(0.27)
SHIFT	0.076***	0.076**	0.077***	0.0522**	0.0543**
	(3.41)	(2.17)	(3.62)	(2.39)	(2.48)
NMANPRES	0.0021**	0.0021***	0.0021**	0.00269***	0.00275***
	(2.15)	(3.46)	(2.19)	(2.70)	(2.75)
OUTW	−0.043	−0.040	−0.043	0.0609**	−0.0537*
	(1.52)	(1.56)	(1.54)	(2.14)	(1.89)
SHARES	−0.101	−0.103	−0.102	−0.0766	−0.0885
	(1.60)	(1.62)	(1.62)	(1.38)	(1.59)
PBRI	0.0137	0.0140	0.0138	0.0145	0.0173
	(0.62)	(0.69)	(0.69)	(0.72)	(0.82)
PJEVAL	0.0001	0.0001	0.0001	0.0001	0.0001
	(1.17)	(1.17)	(1.17)	(1.23)	(1.22)
CR5	−0.00009	0.00016	—	−0.0017*	0.00008
	(0.10)	(0.28)		(1.66)	(0.13)
CRU	0.0004	—	—	0.00259**	—
	(0.34)			(2.18)	
PROFIT	—	—	—	−0.01028**	−0.00957**
				(2.15)	(2.00)
Constant	4.090	4.080	4.080	4.683	4.579
Adjusted R^2	0.4276	0.4280	0.4300	0.3516	0.3466
n	519	519	519	496	496
Wage gap	1.07%	1.14%	1.12%	−2.5%	−0.63%
F	21.37	23.59	23.96	15.92	16.44

Wage equations for skilled manual workers

Equation	17	18	19	20	21
PARTE	−0.00081	−0.00089	−0.00082	−0.0026***	0.0025***
	(0.85)	(0.96)	(0.88)	(2.60)	(2.60)
MANE	0.0014**	0.0015**	0.0015**	0.00133**	0.00134**
	(2.32)	(2.42)	(2.44)	(2.22)	(2.25)
FEMMANE	−0.0034***	−0.0035***	−0.0034***	−0.0041***	−0.0041***
	(6.98)	(7.17)	(6.96)	(7.75)	(7.84)
REC15	−0.0197	0.0014	0.0002	−0.0261	−0.0253
	(0.50)	(0.08)	(0.00)	(0.55)	(1.24)
LTDCO	−0.0008	−0.0029	−0.0008	−0.0008	−0.0008
	(0.00)	(0.07)	(0.00)	(0.02)	(0.03)
SKILLED	−0.0004	−0.0004	−0.0006	−0.0004	−0.0004
	(1.09)	(1.04)	(1.50)	(1.03)	(1.02)
TOTAL	0.00001	0.00001	0.00001	0.00001	0.00001
	(0.96)	(1.03)	(1.41)	(1.42)	(1.44)
FOREIGN	0.0452	0.0468	0.0468*	0.0389	0.0388
	(1.60)	(1.59)	(1.66)	(1.42)	(1.42)
BLACK	−0.0009	−0.0009	−0.0009	−0.0016**	−0.0016**
	(1.19)	(1.19)	(1.13)	(2.31)	(2.32)
EXTENT	0.0003	0.0003	0.0008	−0.0008	−0.0007
	(0.43)	(0.42)	(1.19)	(0.94)	(0.93)
SHIFT	0.0693***	0.0696**	0.0767***	0.0564***	0.0564***
	(3.58)	(3.61)	(4.04)	(2.77)	(2.78)
NMANPRES	0.0024***	0.0024***	0.0024***	0.0028***	0.0028***
	(2.75)	(2.77)	(2.80)	(3.10)	(3.11)
OUTW	0.0153	0.0160	−0.0133	0.0133	0.0133
	(0.63)	(0.66)	(0.55)	(0.51)	(0.51)
SHARES	0.0146	0.0124	0.0170	−0.0082	−0.0083
	(0.27)	(0.23)	(0.32)	(0.16)	(0.17)
PBR1	−0.0068	−0.0052	−0.0031	−0.0293	−0.0291
	(0.28)	(0.22)	(0.13)	(1.28)	(1.21)
PJEVAL	0.0003	0.00003	0.00002	0.00001	0.00001
	(0.31)	(0.31)	(0.29)	(0.12)	(0.12)
CR5	0.00054	0.00095*	—	−0.00054	0.00055
	(0.64)	(1.85)		(0.57)	(1.00)
CRU	0.0004	—	—	0.00259**	—
	(0.61)			(0.03)	
PROFIT	—	—	—	−0.0107**	−0.0107**
				(2.37)	(2.37)
Constant	4.517	4.501	4.495	4.844	4.843
Adjusted R^2	0.1832	0.1842	0.1802	0.1767	0.1783
n	516	516	516	493	493
Wage gap	−0.30%	0.14%	0.02%	−2.47%	−2.47%
F	7.07	7.46	7.66	6.56	6.93

*indicates significance at the 10% level.
**indicates significance at the 5% level.
***indicates significance at the 1% level.

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