

Wage Share, Concentration and Unionism\*

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This paper is circulated for discussion purposes only its contents should be considered preliminary.

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Whilst a considerable amount of empirical work has been done on the relationship between wage levels, the degree of industrial concentration and unionism very little has been done on wage share. This is a rather surprising state of affairs given that a positive relationship between wage levels and both concentration and unionism need not imply that the functional distribution of income between labour and capital is affected by either variable.<sup>1/</sup> Indeed such observations are quite consistent with the view that greater concentration implies a lower share of value-added going to workers and that this outcome cannot easily be averted by union action. Whether or not such a view is tenable requires a direct examination of wage shares and provides the motivation for this paper.

Turning first to the relationship between wage share and concentration, oligopoly theory would suggest that the share of profits will tend to rise, and therefore the share of wages will tend to fall, as concentration increases. This is the typical theoretical prediction assuming profit maximising behaviour. A fairly general formulation is

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<sup>1/</sup> The results of Philips (1971) for Belgium, France and Italy, Jenny (1978) for France, Sawyer (1973), Hood and Rees (1974), Geroski, Hamlin and Knight (1980) and Clarke (1980) for the U.K. all reveal a positive relationship between concentration and wage levels, as did the earlier work of Weiss (1966) for the U.S. However, in many cases this result tends to break-down on further examination. For example Sawyer and Hood and Rees find that the significance of concentration disappears in the presence of a plant-size variable, and Weiss finds it disappears as variables defining the personal characteristics of the worker are introduced. Wabe and Leech (1978) also find no significant concentration effect for the U.K. in the presence of twelve other skill and industry characteristic variables. In contrast with these rather ambiguous results for concentration there is by now a fairly substantial body of results revealing a positive and significant effect of unionism, measured in a variety of ways, see e.g. Mulvey (1976), - the main subject for discussion being the magnitude of the impact rather than its statistical significance.

provided by equation 1 in which the ratio of profits plus overhead costs  $(\Pi + F)$  to total revenue  $(R)$  is determined by the Herfindahl index of concentration  $(H)$ , the degree of collusion  $(\alpha)$ <sup>1/</sup> and the industry elasticity of demand  $(\eta)$ , if we assume constant marginal costs and a homogenous product, see Cowling (1980).

$$(1) \quad \frac{\Pi + F}{R} = \frac{\alpha}{\eta} + \frac{(1 - \alpha)H}{\eta}$$

Since we would also expect that the degree of collusion  $(\alpha)$  would increase with concentration and that the more concentrated the industry the more likely would be investment in attempts to reduce the industry elasticity of demand  $(\eta)$ , for example via advertising expenditures, then we would conclude that increases in concentration will tend to raise the ratio of profits plus overheads to sales revenue. If we also assume that marginal production costs comprise raw materials costs plus wage costs, then  $F$  comprises interest payments, rent, depreciation and salaries.<sup>2/</sup> Multiplying through by the ratio of sales revenue to value added  $(Y)$  yields equation (2):

$$(2) \quad \frac{\Pi + F}{Y} = \left( \frac{\alpha}{\eta} + \frac{(1 - \alpha)H}{\eta} \right) \frac{R}{Y}$$

and  $\frac{\Pi + F}{Y} = 1 - \frac{W}{Y}$ , given that  $Y = \Pi + F + W$ , i.e. value added

<sup>1/</sup>  $\alpha$  represents each firms' expectations concerning the response by rivals to its own output decisions expressed as an elasticity,  $\frac{dx_j}{x_j} / \frac{dx_i}{x_i}$ ,  $j \neq i$ .  $\alpha$  will vary between zero (the Cournot case) and one (full collusion).

<sup>2/</sup> As a simplification we assume the labour component of non-production activities like advertising and R&D is essentially salaried and that these activities do not involve the use of raw materials.

comprises profits, overhead costs and the wage bill. Thus wage share  $\frac{W}{Y}$  is negatively related to the degree of concentration due to the fact that we expect the degree of monopoly  $((p - mc)/p)$  to rise with concentration.<sup>1/</sup> In two extreme cases this would not be true: (a) with perfect collusion at all levels of concentration, that is with  $\alpha = 1$ , the degree of monopoly and therefore the share of wages would be invariant to the degree of concentration and (b) changes in concentration may have no effect if the degree of monopoly is effectively constrained by the existence of potential entrants. Thus in the first case the monopoly outcome always prevails and in the second case the competitive outcome could prevail despite the existence of apparently concentrated market structures. The first case is unlikely where we consider a substantial range in the degree of concentration given that there will always be gains to be made from undetected price-cutting, and the probability of detection falls with  $H$ , see Stigler (1964); and the second case will generally be ruled out, either because of the existence of barriers to entry or because of investment in excess capacity as a credible deterrent to entry, see e.g. Spence (1977). Thus, where competitive labour market conditions prevail, our expectation is that wage share will be lower the higher is the degree of concentration. Note that the share of salaries is not defined in this model since salaries are regarded as an element of overhead costs. If salary rates are competitively determined we would expect salary share to be invariant to concentration, but in a world of managerial capitalism we would expect the size and expense of the salariat

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<sup>1/</sup> Note that although the degree of monopoly, which in this formulation equals  $(\Pi + F)/R$ , will rise with concentration ( $H$ ), the other component  $\frac{R}{Y}$  will fall. However it is easy to show that so long as the ratio of wage bill ( $W$ ) to materials bill ( $M$ ) is fixed (or falling) then an increase in concentration leading to an increase in the degree of monopoly will, according to this model, imply a fall in the wage share.

to grow with concentration as the managerial hierarchy skim off for themselves at least a fraction of the increment in profits, and thus we would expect to observe a positive association with concentration, Williamson (1964).

It is interesting at this particular juncture to consider the impact of import penetration since we would expect it to be different in the case of wage or salary share. Conceptually two distinct effects of import penetration can be isolated. First, for any given degree of domestic concentration increased import penetration may imply a lower degree of monopoly and therefore a lower share of profits plus overheads and a higher wage share. In terms of equation (1) this would imply a lower value for the Herfindahl measure of concentration than would have been true using simply the market shares of domestic firms. However the outcome is not unambiguous. It only becomes unambiguous if we assume <sup>1/</sup> that imports are competitive rather than controlled by domestic firms. If, alternatively, we assume that each domestic firm's share of domestic output equals their share of imports then the degree of monopoly will remain invariant to import penetration, and so will the share of profits plus overheads and thus the wage share. It may also be the case that in some industries concentration could increase with import penetration by virtue of the fact that the dominant corporations control virtually all

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<sup>1/</sup> This question is explored at some length in Cowling (1981), Chapter 6. Suffice it here to give Ford as an example. As well as having a substantial share of domestic output Ford also has a substantial share of imports into the U.K. An increase in imports by Ford does not imply that the car market in the U.K. is becoming less concentrated.

imports. Thus the link between import penetration and wage share via the degree of monopoly is unclear. The other effect of import penetration will be to reduce capacity utilization. Whilst in the very short-run this may imply that wage share rises, given that  $Y$  may initially fall faster than workers are laid-off, we would not expect this to persist. However in the case of overhead labour this effect would tend to persist and the share of profits would fall as the share of overheads increased. We therefore conclude that whilst we do not expect wage share to vary with import penetration, so long as the degree of monopoly is unaffected, we expect salary share to be directly related to import penetration via the capacity utilization effect.

Putting the question of imports to one side for the moment our central conclusion to this point is that an increase in concentration will normally imply a fall in the share of wages, but is quite consistent with a constant or increasing share of salaries, taking salaries to refer to overhead labour costs. The question now arises as to whether or not the existence of union power modifies this result. At first sight this would not appear to be the case. Union pressure on wages (pushing them up) or productivity (stopping it being pushed up) would simply determine the position of the marginal cost curve and the wage share would remain unchanged. That is, so long as the R.H.S. of equation (2) remains fixed then wage share remains fixed; wage increases will be marked up to preserve the degree of monopoly  $((p - mc)/p)$ . However Kalecki (1971) felt that the pressure of organised labour would itself reduce the degree of monopoly in the oligopoly case since firms would be hesitant about increasing price in response to local wage increases. His analysis is a variant of the kinked demand curve hypothesis which is based on pessimistic

expectations on the part of each firm regarding the reaction of rivals to its own price changes. Thus in a world of plant-by-plant, or more specifically firm-by-firm, union bargaining the degree of monopoly would be lower than if competitive labour markets prevailed. Thus in a world of oligopoly greater union pressure would imply a higher wage share. Insofar as bargaining is firm by firm, and insofar as the spillover effects from one bargain to another are either unimportant or very much delayed, this would appear a plausible hypothesis. But where bargaining over wages is done collectively for the industry, or where individual firm bargains are rapidly transmitted over the whole industry, then we would expect the impact on distribution to be limited. Indeed in tightly organised, concentrated industries we can expect a high degree of collusion over wage determination as we would over price/output determination. This could come about via multi-employer agreements or single-employer agreements. In the former case the collusion is overt, whereas in the latter case collusion may be achieved by wage leadership with the dominant firm or firms setting the pace. In general we may conclude that the degree of collusion on wages, like the degree of collusion over price or output, would increase with concentration, but whether or not the product market defines the relevant labour market remains a problem.

Kalecki has identified one way in which union pressure can affect wage share and we have indicated that his hypothesis must be severely qualified. However even if the degree of monopoly remains unaffected by union pressure, the wage share could still rise because of it. This will come about if union pressure reduces the ratio of materials expenditure to wage bill ( $M/W$ ), since a reduction in  $M/W$  will reduce



M/Y and therefore R/Y, for a constant degree of monopoly.<sup>1/</sup> Thus we can see in equation (2) that union pressure can secure a reduction in profit share, and therefore an increase in wage share, without affecting the degree of monopoly. This comes about because workers are changing the composition of marginal costs as well as raising their level. Imagine, for example, a fixed-coefficient technology using materials and labour. A wage increase of 10%, secured by union pressure, will imply a price increase of less than 10% to maintain the degree of monopoly because marginal cost will have risen by less than 10%. However if union pressure implies that labour is getting more expensive relative to materials then there will be a tendency to substitute material for labour. This could come about via an existing technology or a new technology induced by the resulting disequilibrium, but perhaps the more important reaction would be a tendency to increase the extent of domestic sub-contracting with the competitive fringe of firms or to increase sourcing from foreign suppliers, who are themselves faced with a less well-organised work force. By such devices firms under union pressure could circumvent some of the consequences, the implication being that although unions might secure higher wages whether or not they will secure a higher wage share in the long-term is more problematic.

The remaining problem is how union pressure is to be measured. Basically two approaches offer themselves. First, union coverage or union membership can be used. The former refers to the proportion of the

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<sup>1/</sup> Note that R/Y is a function of the degree of monopoly ( $\mu$ ) and M/W. Fixing  $\mu$  implies that R/Y can only vary as M/W varies.

labour force which is covered by the union rate. This measure covers a broader spectrum of workers than union members and is more readily available at the industry level because of the problem of allocating the membership of general unions to specific industries. The information on coverage has the added advantage that it refers to male manual workers only, and is therefore more appropriate to a study of wage (as opposed to labour) share. The alternative approach is to measure strike activity by the number of stoppages, the number of days lost or the number of workers involved. Coverage or membership will give some indication of potential power whereas strike activity is at least one index of militancy. Obviously neither is completely satisfactory as an index of union pressure. Potential power may remain potential rather than real and apparent militancy revealed by strikes may be a better index of employer intransigence. Given this we will experiment with the various measures rather than ruling out any one of them on a-priori grounds.

The general form of our estimating equation is given by equation (3), and incorporates a number of approximations for use on an inter-industry cross-section:

$$(3) \quad \frac{W}{Y} = \beta_0 C^{\beta_1} A^{\beta_2} IMP^{\beta_3} U^{\beta_4} e^v$$

where  $\frac{W}{Y}$  is wage share of operatives

$C$  is a measure of concentration i.e. the Herfindahl index (H) or the five-firm concentration ratio ( $CR_5$ ).

$A$  is a measure of advertising intensity: the ratio of advertising

expenditure to sales.

IMP is a measure of import share: the ratio of imports to domestic sales plus imports.

U is a measure of union pressure: alternatively a coverage, membership or strikes variable.

v is a disturbance term.

The degree of collusion ( $\alpha$ ) is non-observable but is assumed to be determined by the degree of concentration and this imposes a non-linearity on the equation. The price-elasticity of demand ( $\eta$ ) is non-observable at the level of industrial disaggregation we would wish to work at, but we expect that it will be determined by the intensity of advertising, with advertising normally serving to create buyer inertia and therefore a more price-inelastic demand. Import share (IMP) is added to account for the fact that the available concentration measures do not incorporate imports. It is only relevant insofar as taking account of imports would have modified the measure of concentration actually used. The effects of concentration and union pressure are assumed to be interactive and thus the linear in logarithms formulation is favoured.

As argued earlier,  $R/Y$  will be determined by the degree of monopoly ( $\mu$ ) and union pressure, insofar as this may imply a change in the composition of marginal costs in favour of wage costs. It will also be importantly influenced by the varying degrees of vertical

integration in the different industries - variation which has nothing to do with the share of value-added going to wages.<sup>1/</sup> We will therefore drop  $R/Y$  from the estimating equation and assume that the variables included in (3) explain that part of the variation in  $R/Y$  which contributes to an explanation of  $W/Y$ . Thus we are allowing the union variables to effect wage share via the degree of monopoly and/or via their impact on the composition of marginal costs.

The expected signs of the coefficients in equation (3) are as follows:

$$\beta_0 > 0 ; \beta_1 < 0 ; \beta_2 < 0 ; \beta_3 \begin{matrix} > \\ < \end{matrix} 0 ; \beta_4 > 0 .$$

We therefore expect that those variables contributing to a higher degree of monopoly, concentration and advertising, will have a negative impact on wage share whereas union pressure may tend to counteract this effect. The impact of import share is ambiguous because we do not know the extent to which imports are controlled by the dominant domestic corporations. If imports are outside such control then they will tend to reduce the degree of monopoly and therefore tend to raise the share of wages in the industry in question. Alternatively they may lie within the control of the dominant domestic firms and may thereby tend to enhance such dominance, raise the degree of monopoly and reduce the wage share, or they may leave the degree of monopoly, and therefore wage share,

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<sup>1/</sup> It can easily be shown that the degree of vertical integration will effect both our measure of  $\mu((\Pi + F)/R)$  and  $R/Y$  but in an equal and opposite direction thus leaving  $(\Pi + F)/Y$ , and therefore  $W/Y$  unaffected.

undisturbed.

We will also examine the interindustry variation in salary share using the same formulation. Our expectations on the sign of the coefficients will however be different:

$$\beta_0 > 0 ; \beta_1 > 0 ; \beta_2 > 0 ; \beta_3 \begin{matrix} > \\ < \end{matrix} 0 ; \beta_4 > 0 .$$

In this case we expect that salary share will increase with the degree of monopoly, but will also rise with import share due to the capacity utilization effect. Given that our union pressure variables do not distinguish between direct and overhead labour we might also expect a positive coefficient on these variables.

It should perhaps be noted at this stage that whereas the various studies of the inter-industry variation in wage rates have included lots of variables measuring the personal characteristics of the work force, we are choosing to assume that the only relevance of such variables for the determination of wage share is when they are in turn determined by either concentration or union pressure, and since these variables are included, we have nothing further to add. For example studies of wage rates consistently reveal a very significant role for the proportion of female workers in the industry, but we are saying that unless this proportion reflects a concentration or unionism effect then although it may add to an explanation of wage rates there are no grounds for believing that it will affect wage share.

### Previous Results

There is only one published study relating wage share to concentration and really nothing on unionism and wage share. Moroney and Allen (1969) find the relationship between wage share and concentration is generally insignificant. This is not surprising given their observational technique. Their data comprises nine regional observations on each of sixteen manufacturing industries in the U.S. and they estimate an inter-regional relationship for each of these industries. This cannot be very illuminating because it is unreasonable to assume that in manufacturing monopoly power is going to vary regionally in a unified market like the U.S. and therefore variations in concentration within an industry across regions will not reflect variations in monopoly power - they will simply reflect locational decisions by the major corporations. An unpublished study by Barbee (1974) is of more interest. This comprises an inter-industry estimation for the U.S. of the relationship between wage share, concentration and capital intensity. The coefficient on concentration is negative and highly significant for both 1963 and 1967. Recent work by Hitiris (1979) on U.K. data for 1963 and 1968, although not dealing specifically with wage share, is suggestive of the same conclusion. His dependent variable is total employment income (i.e. wages and salaries) as a ratio to sales revenue and he finds this is significantly, and negatively, related to concentration.

No econometric study has been reported on wage share and unionism but Cowling and Waterson (1976) related changes in the degree of monopoly  $((p - mc)/p)$  to changes in union membership and failed to detect any significant effect. Also, in recording a five-fold increase

in union strength over the period 1929/52 for the U.S., Levinson (1954) noted that no redistribution from profits to wages had been achieved. Obviously such a broad-based comparison can be interpreted in a variety of ways given that no attempt was made to net out the effect of changes in other possible determinants of wage share.

### Some New Results

Table 1 includes results for 1968 and 1973. The sample comprises a cross-section of all Minimum List Heading industries, except for nationalized industries, on which the relevant data was available.<sup>1/</sup> In all cases we find a strongly significant, negative relationship between wage share and concentration, whether measured by the Herfindahl index or the five-firm concentration ratio.<sup>2/</sup> This remains the case with or without the addition of an array of other variables. The results on unionism are strongly suggestive but not as clear-cut. In 1973 we measured unionism in terms of strike activity (number or duration of stoppages) and the coverage of union agreements, but the coverage measure ( $U_4$ ) is not available for the full sample, nor is it available for other years. On the basis of this limited sample for 1973 (66 industries), the results would suggest a positive and significant effect of unionism as measured by the coverage variable. This appears also to

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<sup>1/</sup> The data base for 1968 was kindly provided by Bruce Lyons and excludes those industries with "miscellaneous" in their titles.

<sup>2/</sup> In several unreported regressions using a limited sample for 1968 (n=84) we used Herfindahl figures kindly provided by Mike Waterson. In these estimates (unlike the results reported here) the Herfindahl index did not consistently outperform the five-firm concentration ratio. At first sight this may appear surprising given that our theoretical model indicates the appropriateness of the Herfindahl measure. At second sight this is not so surprising given that the exact value of  $CR_5$  is available from the Census of Production whilst the Herfindahl has to be estimated. Given that this can involve substantial error the general performance of the Herfindahl measure is even more remarkable.

be the case for the full sample of industries in 1973 where we use the number of stoppages variable ( $U_2$ ), but not where we use the duration of stoppages variable <sup>1/</sup>. A similar pattern appears in 1968 and we therefore simply report the significant result for the number of stoppages variable  $U_2$ . However, the significant result for unionism does not appear to carry over where further determinants of the degree of monopoly are added to the equation. In equation (1) advertising intensity (A) and the share of imports (IMP) are added and the significance of unionism, as measured by union membership ( $U_1$ ), declines. In equation (2) the same formulation, but replacing union membership ( $U_1$ ) by strike activity ( $U_2$ ), reveals unionism to be insignificant. In both equations advertising intensity is highly significant and it is the presence of this variable which is rendering the unionism variable less significant. However since our model provides a link between the degree of monopoly and wage share, and advertising can be considered one determinant of the degree of monopoly, working via the elasticity of demand, the presence of the advertising variable is theoretically justified. It also attracts the expected, negative, sign. We must therefore conclude, on the evidence of the 1968 sample, that the apparent positive impact of unionism revealed in 1973, where information on advertising was unavailable, becomes rather less clear when a more complete specification of the model is used. This result obviously needs further examination especially since the coverage variable ( $U_4$ ),

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<sup>1/</sup> A two year average is taken for these variables for both the 1968 and the 1973 regressions, in order to account for the fact that it may take time for strikes to feed through into wage increases. Averaging also removes some of the year by year volatility in the series', and alleviates possible endogeneity problems (these will be discussed more fully later). In the event, results using purely contemporaneous strikes variables proved little different anyway.



Table 1 Wage Share Regression Results

Dependent Variable:	(1)	(2)	(3)	(4)	(5)	(6)
$\ln W/Y$	1968			1973		
constant	-2.902 (-5.08)	-2.537 (-5.03)	-1.888 (-2.75)	-0.377 (-1.55)	-0.404 (-1.63)	-4.249 (-3.42)
$\ln H$	-0.150 (-4.78)	-0.157 (-4.87)				
$\ln CR_5$			-0.230 (-3.99)	-0.246 (-3.77)	-0.222 (-3.41)	-0.178 (3.01)
$\ln A$	-0.144 (-4.50)	-0.152 (-4.84)	-0.140 (-4.24)			
$\ln IMP$	0.001 (0.05)	0.001 (0.06)	-0.014 (-0.66)			
$\ln U_1$	0.144 (1.54)		0.146 (1.54)			
$U_2^*$		0.225 (1.17)		0.727 (2.50)		
$U_3^*$					0.059 (1.60)	
$\ln U_4$						0.858 (2.31)
$\ln I/Y$	-0.079 (-1.42)	-0.091 (-1.64)	-0.108 (-1.94)			
n	118	118	118	100	100	66
$R^2$	0.347	0.341	0.312	0.150	0.119	0.168
F	11.90	11.60	10.15	8.59	6.55	6.38

t statistics in parentheses

\* The logarithmic transformation performed rather less well.

Definition of Variables:

W = wage bill (operatives)	Y = value added
H = Herfindahl index of concentration	$CR_5$ = five-firm concentration ratio
A = advertising expenditure ÷ sales	IMP = imports ÷ sales plus imports
$U_1$ = union membership (%) in 1963	$U_2$ = number of stoppages ÷ employment (an average for the year of estimation and the preceding year) $\frac{1}{2}$
$U_3$ = days lost ÷ employment (an average for the year of estimation and the preceding year) $\frac{1}{2}$	I = investment
$U_4$ = coverage of collective bargaining agreements (%)	

Data Sources:

The data base for 1968 was kindly provided by Bruce Lyons.

employment, W, Y, $CR_5$ , A, I	: <u>Census of Production</u>
H	: kindly provided by Steve Davies
$U_1$	: <u>Industrial Relations Research Unit, University of Warwick.</u>
$U_2, U_3$	: <u>Department of Employment, (unpublished)</u>
$U_4$	: <u>New Earnings Survey, Department of Employment, Table 110.</u>
IMP	: <u>Central Statistical Office (unpublished)</u>

$\frac{1}{2}$  Employment data was not available for 1967 so the 1968 employment figures were used for both years in the 1968 regressions.

was not available in 1968 to be evaluated in the presence of the advertising variable.

The other variable included on the grounds that it may possibly be linked with the degree of monopoly was import share (IMP). This was tried in both 1968 and 1973 and in no case did it appear to be significant.<sup>1/</sup> This is unsurprising and consistent with the view that domestic firms exert considerable direct or indirect control over the supply of imports. A last variable which was added to some versions of our model was the ratio of investment to value-added. This was generally insignificant and never altered the general texture of our results. It was added largely in anticipation of people arguing that of course wage share would appear to be negatively related to concentration because concentrated industries tend to be capital-intensive and there are good (neoclassical) reasons for expecting wage share to be inversely related to capital intensity. Capital stock data is not available by MLH industries so we use investment data and equations (1), (2) and (3) represent alternative versions of our model but including I/Y. It can be readily seen that concentration remains highly significant and indeed the results differ only minimally with or without the inclusion of I/Y.

Our central result on wage share is therefore that those factors which have led to a higher degree of monopoly in certain industries, that is higher levels of concentration and advertising intensity, have

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<sup>1/</sup> As well as being tried in both 1968 and 1973, IMP was also tried in alternative versions: (1) imports ÷ sales and (2) imports : sales plus imports minus exports. They were all equally insignificant in both 1968 and 1973.

led to lower wage shares. We also have some indication that unionism can raise the share of wages, although this is not well established. One interesting question which can be asked is what is the net effect of higher levels of concentration, given that as well as raising the degree of monopoly higher levels of concentration may result in higher levels of union activity which may nullify the direct effect of concentration on the degree of monopoly and therefore on wage share. To this end we ran simple regressions of wage share on concentration for 1968 and for each year between 1970 and 1973. The results are reported in Table 2 and reveal that for each year there is a significant negative relationship between wage-share and concentration. As well as confirming the robust nature of the concentration effect these results also reveal that although unions may act to counteract the impact of concentration on wage share they are at most achieving only a diminution of the negative impact. Concentrated industries appear to hand-over a lower proportion of their value-added to wage earners.

On the grounds of the possible endogeneity of the strikes variable we used a lagged version of the strikes variable as an instrument and generally found little change in the size or significance of any of the coefficients. Perhaps this is to be expected since union militancy is likely to have a more obvious and direct relationship with the level of wages rather than with the share of wages. Thus whereas it may be appropriate to estimate a two-equation model using simultaneous techniques when investigating the links between wage levels and union pressure it appears somewhat less obvious in the case of wage share. One example for 1973 of our results using an instrumental variable is reported below alongside an equivalent formulation estimated by ordinary least squares techniques:

Table 2 : Simple Regressions of Wage Share on Concentration: 1968; 1970; 1971; 1972; 1973: Dependent Variable:  $\ln(W/Y)$

	Constant	$\ln CR_5$	$\ln H$	$R^2$	F	n
1968	-1.637 (-15.86)		0.161 (-5.06)	0.181	25.58	118
1970	-0.358 (-1.61)	-0.205 (-3.47)		0.109	12.02	100
1971	-0.430 (-1.85)	-0.188 (-3.06)		0.087	9.35	100
1972	-0.488 (-1.95)	-0.178 (-2.72)		0.070	7.42	100
1973	-0.385 (-1.54)	-0.210 (-3.22)		0.096	10.38	100

(t-values in parentheses)

$$\text{OLS: } \ln(\hat{W}/Y) = -1.014 - 0.233 \ln CR_5 + 0.707 U_2 - 0.062 \ln(I/Y) \quad R^2 = 0.156$$

$$\quad \quad \quad (-1.16) \quad (-3.47) \quad \quad \quad (2.42) \quad \quad (-0.76) \quad \quad \quad F = 5.89$$

$$\quad n = 100$$

$$\text{Instrumental Variable: } \ln(\hat{W}/Y) = -0.987 - 0.239 \ln CR_5 + 0.806 U_2 - 0.060 \ln(I/Y)$$

$$\quad \quad \quad (-1.13) \quad (-3.52) \quad \quad \quad (2.44) \quad \quad (-0.73) \quad \quad \quad R^2 = 0.155$$

$$\quad F = 5.85$$

$$\quad n = 100$$

We get the same general result whether or not  $\ln(I/Y)$  is included.

This version of the equation simply serves to illustrate the general insignificance of  $I/Y$ .

All the results reported to this point relate to wage share as defined by operatives and we have chosen this definition as being closest to our theoretical requirement. Our results for salary share in 1/ 2/ 1968 are quite striking:

1/ The results for 1973 are not as clear cut, with the concentration ratio appearing insignificant. It is likely that this is due to the turbulence in the labour market in 1973 when the salariat (temporarily) lost out in the rapid inflationary spiral of that year.

2/ Salaries are broadly defined as the earnings of administrative technical and clerical staff and are taken from the Census of Production.

$$\ln(S/Y) = -3.702 + 0.104 \ln H + 0.007 \ln A + 0.039 \ln IMP + 0.335 \ln U_1$$

(-7.31)
(3.74)
(0.25)
(2.21)
(4.07)

$$- 0.110 \ln(I/Y)$$

(-2.24)

$$R^2 = 0.268$$

$$F = 8.18$$

$$n = 118$$

Again we get a significant concentration effect, but in the case of salaries it is positive whereas for wages it was negative. The salariat is apparently able to gather for itself some of the fruits of increased monopoly power. However the impact of advertising on salary share is insignificant. This may be because, while advertising contributes to the degree of monopoly it is also an overhead cost competing with the salariat for a share of the monopoly cake, so that the impact is rather different than in the case of concentration. Similarly with the investment variable (I/Y): the higher the level of capital intensity the higher will be ratio of capital costs to value-added, so leaving less room for salaries, given the degree of monopoly.<sup>1/</sup> This could explain the significant negative coefficient on the investment variable.

The other two variables in the salary share equation, import penetration (IMP) and union membership ( $U_1$ ) also attract significant coefficients and both results are of some interest. Import penetration appears to result in an increase in salary share which gives strong support to the capacity utilization hypothesis concerning the impact of imports. That is the overwhelming effect of import penetration is not

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<sup>1/</sup> Note that in the constant marginal cost case the degree of monopoly can be written as  $(\Pi+F)/R$ , i.e. the ratio of profits plus overheads to sales revenue. Given a limit to the extent reported profits can be squeezed, as overhead costs which are not salary costs increase so salaries will be "crowded out".

to reduce the degree of monopoly, and thereby the share of salaries, but to reduce the level of domestic output and thereby increase the ratio of overhead costs (including salaries) to output. This is perfectly consistent with the non-significant impact of imports on wage share, since we are assuming that wage costs vary directly with output rather than with capacity.

The union membership variable also appears to have a positive effect on salary share, and this is precisely the result we would expect provided we were capturing the appropriate union membership, and that this in turn was an accurate index of union power and militancy. The former condition is by no means met since  $U_1$  refers to total union membership and not simply to membership in those unions catering for the salariat. However there may be a close correlation between general union membership and the appropriate union membership and this requires more detailed investigation. On the second condition it does appear to be the case that greater militancy by salaried staff has been associated with increased union membership.

### Conclusions

Our analysis of the inter-industry variability in wage share has revealed that factors determining the degree of monopoly, like concentration and advertising, have a significant negative effect on wage share. This effect may to some degree be offset by union action, although our results on unionism are not very robust, but the net effect of higher levels of concentration on wage share are unambiguously negative. In a time-series perspective this would imply that the tendency to a

higher degree of concentration will imply a tendency for wage share to fall. In contrast with the results for wage share, our investigation of the determinants of salary share reveals that higher concentration implies higher salary shares. There is also evidence that unionism can have a significant positive impact on salary share. A particularly interesting result is that although import penetration appears to have no effect on wage share it appears to result in a higher salary share. This points to a capacity utilization effect of import penetration rather than a degree of monopoly effect.

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