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Wage Share, Market Power and Unionism: Some Contrary U.S. Evidence

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Abstract

In a recent article, Cowling and Molho (1982) presented empirical evidence on the relationships among the wage share, market power, and unionism in the U.K. Using multiple regression analysis on cross-sectional 1968 data for 118 industries,[1] they found strong, negative relationships between the share of production worker wages in value added and two measures of monopoly power in the product market, namely, concentration and advertising intensity. However, utilizing several alternative measures of union power, they found only limited support for the hypothesis that union power is positively associated with this wage share. Cowling and Molho (hereafter, GM) also examined the relationships between the share of non-production worker salaries in value added and these same market power variables. They found a significant, positive relationship between the salary share and concentration and no relationship between the salary share and advertising intensity. Their one puzzling result was that union power appeared to be more closely related to the salary share of nonproduction

workers than it was to the wage share of production workers. The C-M results with respect to the concentration-wage share relationship are inconsistent with the only previously published study on the topic (Maroney and Allen, 1969) but consistent with the unpublished work of Barbee (1974). Since little empirical work has been done on this question, and since no other study has estimated the effect of either advertising or union power on the wage and salary shares, it is clear that more research on these questions is in order.

Introduction

The purpose of this paper is to present empirical findings on tests of the C-M model using **US.** data. We pay special attention to the role of advertising and our results differ in important respects from the C-M results, indicating that the basic issues are far from settled.

The U.S. Sample Data

We test the C-M model[2] using 1967 US. data for 208 four-digit manufacturing industries, as defined in the Standard Industrial Classification System. The sample consists of all U.S. manufacturing industries for which the requisite data are available except (1) those industries with "miscellaneous" or "not elsewhere classified" in their titles, and (2) the several industries primarily military-related, for which government is the major purchaser.[3] For reasons to be discussed shortly, the sample has been divided into two subsamples, based on whether the industry is primarily involved in producing consumer goods or producer goods. For each subsample, measures of the wage and salary shares are regressed on measures of market concentration, advertising intensity, unionization, and capital intensity.[4] Our measure of market concentration *(C)* is the four-firm concentration ratio reported by the U.S. Bureau of the Census, as adjusted by Weiss and Pascoe (1981) to account for overly broad or narrow product definitions, regional and local markets, and imports.[5]

Wage Share, Market Power and Unionism: Some Contrary U.S. Evidence

Advertising intensity *(A)* is measured as the 1967 ratio of advertising expenditures to sales revenues. The advertising-sales ratios, which originated in the U.S. input-output tables, can be found in Ornstein (1977). Our measure of union pressure *(U)* is the percentage of production workers who are covered by collective bargaining, from Freeman and Medoff (1979).[6] Thus, our advertising variable is equivalent to that employed by C-M, while our concentration and union pressure variables are very similar to measures used by C-M. [7] In examining the effects of market power on wage and salary shares, it is important to control for capital intensity, a factor which is notoriously difficult to measure. The C-M measure, the ratio of a single year's investment spending to value added, did not work well. But since their measure seems particularly weak, these results may not be reliable. As an alternative, we have chosen a theoretically preferable measure, the 1967 gross book value of assets divided by the 1967 production worker man-hours *(K).* [8] Data for the capital intensity measure are from U.S. Bureau of the Census (1971b). For each industry in the sample, the wage share *(W)* is calculated as the total compensation of production workers in 1967 divided by 1967 "advertising-adjusted'' value added. This measure includes fringe benefits as well as wages. [9]The basic data are from the U.S. Bureau of the Census (1971b). In the wage share calculations, value added has been adjusted by subtracting each industry's absolute advertising expenditures from its value added.[10] The purpose is to reduce the possibility of finding a spurious relationship between advertising intensity and the wage share. Unlike an ideal measure of value added which would be closely related to the income generated in production, the U.S. Census Bureau's concept of "value added" includes all purchased services, including expenditures for the services of advertising agencies and media time and space.[11] Under these circumstances, an increase in advertising expenditures would reduce the wage share while raising the advertising-to-sales ratio. Correcting the value added figures for advertising eliminates this induced effect. Our measure of salary share *(8)* is the total salaries and fringe benefits paid to non-production workers in 1967 divided by "advertising-adjusted" value added.[12] Again, the basic data are from the U.S. Bureau

of the Census (197 1 b). As noted earlier, we have divided our sample into consumer and producer goods subsamples.[13] The distinction between consumer and producer goods has generally been considered important in assessing the competitive effects of advertising (Comanor and Wilson, 1979, p. 461) and, indeed, most researchers have studied advertising's effects only for consumer goods industries. While the extent of overall sales promotion costs may be an indicator of monopoly, it is generally recognized that producer goods industries typically rely on means other than mass advertising to differentiate their products and typically have much lower advertising intensities than do consumer goods industries.[14] Thus, while a measure of advertising intensity may well be a useful proxy for sales promotion intensity in consumer goods industries, it is unlikely to be for producer goods industries. To the extent that advertising intensity is related to the wage share at all, we should expect to find the relationship in consumer, but not producer, goods industries.[15]

Some New Wage Results

Equations (1) and (2) in Table 1 show our wage share results for the consumer goods and producer goods subsamples, using the linear-in-logs specification favoured by C-M. In both equations, the coefficients on market concentration, one of the two market power proxies, have the expected negative signs but are statistically insignificant. The coefficients of the other

Table I

Regression Equations Explaining Wage Share and Salary Share in US. Manufacturing, 1967

Equation	(I)	(2)	(3)	(4)
Dependent Variable	In *W*	In *W*	In S	In S
Sample	Consumer Industries (n = 64)	Producer Industries (n = 144)	Consumer Industries (n = 64)	Producer Industries (n = 144)
Constant	-0·07048(-0·24)	-0·54919*(-2·40)	-1 ·23740**(-3·24)	- I ·62050**(-6·36)
In C	-0·10430(-1·34)	-0·00914(-0·21)	0·01914(0·19)	0·03312(o-70)
In A	-0·01887 (-0·49)	-0.06142** (-2.92)	-0·06229 (-1·22)	0·04671* (1·97)
In U	0·02606(0·54)	0·05426(I ·32)	-0·01683(-0·26)	0·04881(1 ·05)
In *K*	-0·42497**(-6·93)	-0·21115**(-6·55)	-0·19731*(-2·29)	-0·28538*"(-7 ·99)
R^2	0·57	0·28	0·11	0·34
F	21·8	14·6	2·9	19·3

(The values in parentheses are t-statistics. A one-tailed test is used.)
*Statistically significant at .95 level of confidence.
**Statistically significant at .99 level of confidence.

market power proxy, advertising intensity, also take the expected negative signs in both equations. However, the advertising coefficient is not significantly different from zero in the consumer goods subsample, while it is highly significant in the producer goods subsample. This, of course, is exactly the opposite of what should be expected. It suggests rather strongly that advertising intensity is not serving as a useful proxy for product differentiation-based market power. In any event, the results with the concentration variable along with these

perverse results with the advertising variable do not support the view that market power is inversely related to the wageshare.[16]

The union coverage variable also performs poorly in the wage share equations. The coefficients take the anticipated positive signs but are statistically insignificant. The one variable which clearly plays the predominant role in explaining inter-industry variations in the wage share is capital intensity. It has a highly significant, negative effect in both equations (1) and (2). In fact, a simple regression of wage share on the capital intensity variable performs almost as well in explaining the wage share variation as do equations (1) and (2). It should be noted that the concentration variable *is* inversely correlated with the wage share-the simple correlations are -0.50 in the consumer subsample and -0.20 in the producer subsample. However, it is also correlated with the capital intensity measure ($0.51 and $0.33 for consumer and producer goods subsamples, respectively) and its inclusion in equations (1) and (2) adds very little to the explanatory power provided by the capital labour ratio.[17] Overall, our results with the wage share contrast sharply with those of the Gill study.[18] Product market power and union power do not appear to have an important influence on the wage share. Rather, it is capital intensity which appears to be the major determinant.

Results for salary share

Equations (3) and (4) show our results with salary share for the consumer arid producer goods subsamples. C-M expected that the salary share would be invariant to market power if salary shares were competitively determined, or *positively* related to market power in a world of "managerial capitalism". While their results provided modest support for the "managerial capitalism" hypothesis, our results do not. In both equations (3) and (4), the coefficients on the concentration variable have positive signs but are very weak and insignificant. The advertising variable again performs somewhat perversely. While its coefficient is negative but not significantly different from zero for consumer goods, it is positive and statistically significant for producer goods. As before, it does not appear that advertising is serving as a useful proxy for market power. The union coverage variable is again statistically weak and insignificant, which in the case of salary share is to be expected, since the measure is based on union coverage of production workers only. As with the wage share, the one independent variable which appears to be most important in explaining inter-industry variations in salary share is capital intensity. Its effect appears to be somewhat stronger for producer goods, but it has a statistically significant, negative effect for both subsamples, a result consistent with C-M.

Concluding Remarks

Our results with data for a large sample of U.S. manufacturing industries offer little evidence that product market power is systematically related to *either* the share of production worker wages in value added *or* the share of non-production worker salaries in value added. After allowing for variations in capital intensity, a measure of market concentration contributed little to the explanation of wage and salary shares, while in our more refined tests advertising intensity appeared to be related to wage and salary shares only in producer goods industries, a rather unsatisfactory result. Our findings here differ sharply from those of Cowling and Molho for the U.K., indicating We also found little support, consistent with GM, for the hypothesis that union power can positively affect the wage share. This is also an important question in need of further research. The one variable which consistently performed well in both our wage share and salary share equations was capital intensity. The strong, negative relationship we found between capital intensity and the wage share is consistent with theoretical expectations, while the negative relationship between capital intensity and the salary share is also a plausible outcome. Thus, capital intensity, rather than market power, emerges from our study as the major determinant of wage and salary shares.

Footnotes

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+We gratefully acknowledge the constructive comments of two anonymous referees.

[1] Additional tests were run for 1973, but lack of data necessitated the elimination of some 417 of the variables from the regression equations.

[2] For the theory underlying the model, see Cowling and Molho (1982, pp. 99-102). Also see Kalecki (1939); Weintraub (1958); and Maroney and Allen (1969).

[3] The U.S. Bureau of the Census provides extensive data for 412 four-digit manufacturing industries for 1967. We include only 208 industries in our final sample for the following reasons. Fifty-seven industries were excluded because "miscellaneous" or "not elsewhere classified" appeared in their titles. Advertising data were unavailable for ninety industries. Adjusted concentration data were unavailable for ninety-nine industries. Assets data were unavailable for thirty industries. Finally, union coverage data were unavailable for four industries. Some industries were excluded for more than one reason, resulting in a final total of 208 industries. A complete list of all industries included in the sample is available from the authors.

[4] C-M also included as an additional independent variable the share of imports in total domestic sales. However, they included this measure in their wage share regression only because their concentration measure did not take account of imports. Since our concentration measure (discussed below) has been adjusted for imports. such a measure would be superfluous. C-M offer a second reason for including import share in the salary share regressions, based on a "capacity utilization" effect. However, this would clearly be a short-run phenomenon, and there is no reason to anticipate finding such an effect in cross-sectional analysis.

[5] The Weiss-Pascoe corrected concentration data pertain to 1972. To estimate corrected 1967 ratios, the Weiss-Pascoe figures were multiplied by the ratio of the 1967 Census concentration ratios to the 1972 Census concentration ratios. See U.S. Bureau of the Census (1971a and 1975).

[6] These data relate to 1968-72 and are available only at the three-digit level of aggregation. Therefore, each four-digit industry in our sample takes the value for the three-digit industry group of which it is s part.

[7] They also presented 1968 results using a Herfindah1 measure of concentration and an alternative measure of union pressure based on the extent of strike activity. The choice of concentration and union pressure measures appeared to make little difference. See Cowling and molho (1982, p. 109).

[8] Weintraub (1958), for example, explicitly used the capital-labor ratio in his model. However. an anonymous referee has suggested that our measure of capital intensity may introduce simultaneous equation bias, since the quantity of labor appears implicitly in the numerator of the dependent variable and explicitly in the denominator of our capital intensity variable. However, there are three other terms embodied in these two variables. To the extent that these terms have significant variances of their own, simultaneity should not be a problem. The use of an instrumental variable of a form suggested by Durbin (1954) in place of the capital-labor ratio produced very similar results. These results are available from the authors.

[9] This measure is estimated for each industry by multiplying the ratio of production worker wages to value added by the ratio of total labour costs to payroll for all employees. An alternative measure of the wage share, simply the ratio of production worker wages to value added, produced very similar results.

[10] For each industry, absolute advertising expenditures were estimated by multiplying the industry's advertising-sales ratio by its sales (value of shipments).

[11] For a detailed discussion of the Census Bureau's value added concept, see U.S. Bureau of the Census (1975, Appendix).

[12] The salaries and fringes of non-production workers for each industry are estimated by subtracting from the industry's total labor costs the wages and fringes of production workers, as previously estimated. An alternative measure of salary share, the ratio of non-production worker payroll to value added, produced very similar results.

[13] The classifications are from Ornstein (1977) and are based on an objective criterion, the ratio of consumer goods shipments to the industry's total shipments. While the 50 percent critical value used by Ornstein is arbitrary, the vast majority of industries have ratios above 90 percent or below 10 percent.

[14] The mean advertising-sales ratio for the 64 consumer goods industries in our sample is 3.92 percent. For the 144 producer goods industries, the mean is 0.95 percent.

[15] We are grateful to an anonymous referee for helping to clarify the argument. *Wage Share, Market Power and Unionism: Some Contrary U.S. Evidence*

[16] A number of studies have suggested that the competitive effects of advertising are likely to show up only in non-durable consumer goods industries (Comanor and Wilson. 1979, pp. 461-2). Consequently, we further divided our consumer goods subsample into durable and non-durable categories and ran separate regressions for each. The advertising variable did not approach statistical significance for either category.

[17] It is not obvious that the linear-in-logs specification is most appropriate, although there *is* some reason to expect interaction between the concentration and unionisation variables. Therefore, we also tested equations (1) and (2) in linear form. The one interesting difference is that, in linear form, the concentration variable is statistically significant for consumer goods. However, this result does not apply for the larger producer goods subsample.

[18] These results also contrast with Barbee (1974), who also used 1967 U.S. data. However, there are a number of important differences between Barbee's and the present study. Barbee's study *(1)* failed to separate production worker wages from non-production worker salaries in calculating the wage share; (2) used a less fully adjusted set of concentration ratios; (3) used a less appropriate measure of capital intensity; and (4) did not include advertising or unionisation variables. Barbee found that both concentration and capital intensity were inversely related to the wage share in linear form, a result we found for our consumer subsample only.

References

Barbee, W. C. (1974). "An Enquiry into the Relationship between Market Concentration and Labor's Share of Value Added", unpublished Ph.D. Dissertation, Catholic University of America.

Comanor, William S. and Wilson, Thomas A. "The Effects of Advertising on Competition: A Survey", *Journal* of *Economic Literature,* Vol. 17, No. 2, pp. 453-476.

Cowling, Keith and Molho, Ian (1982). "Wage Share, Concentration, and Unionism", *The Munchester School* of *Economic and Social Studies,* Vol. 50, NO. 2, pp. 99-115.

Durbin, James (1954). "Errors in Variables", *Review of the International Statistics Institute,* Vol. 22, No. 113, pp. 23-32.

Freeman, Richard B. and Medoff, James L. (1979). "New Estimates of Private Sector Unionism in the United States", *Industrial and Labor Relations Review,* Vol. 32, No. 2, pp. 143-174.

Kalecki, M. (1939). "The Distribution of the National Income" in *Essays in the Theory* of *Economic Fluctuations,* London, George Allen and Unwin, pp. 13-41. (Reprinted in W. Fellner and B. Hsley (eds.), *Readings in the Theory of Income Distribution,* Philadelphia, The Blakiston Co., 1951, pp. 197-217.)

Maroney, J. R. and Allen, B. T. (1969). "Monopoly Power and the Relative Share of Labor", *Industrial and Labor Relations Review,* Vol. 22, No. 2, Ornstein, Stanley I. (1977). *Industrial Concentration and Advertising Intensity,* Washington, D.C., American Enterprise Institute for Public Policy Research.

U.S. Bureau of the Census (1971a). *Concentration Ratios in Manufacturing, Part 1* (1967 Census of Manufactures, Special Report), Washington, D.C., U.S. Government Printing Office.

(1971b). *Annual Survey of Manufactures, 1968-9,* Washington, D.C., U.S. Government Printing Office.

(1975). *Concentration Ratios in Manufacturing* (1972 Census of Manufactures, Special Report), Washington, D.C., U.S. Government Printing Office.

Weintraub, Sidney (1958). *An Approach to the Theory of Income Distribution,* Philadelphia, Chilton Publishing.

Weiss, Leonard W. and Pascoe, George (1981). "Adjusted Concentration Ratios in Manufacturing-1972", Federal Trade Commission, mimeo.