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MARKET STRUCTURE AND PRICE BEHAVIOR IN U.S. MANUFACTURING, 1967-1972

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I. Introduction

Beginning with the seminal paper by Weiss (1966), several studies have tested the "administered pricing hypothesis" with cross sectional linear multiple regression models in which price change over some time interval is regressed against industry concentration ratio, change in industry output, change in unit labor cost, and change in unit materials cost over the time interval. Change in industry output is entered on the right-hand side in order to pick up the effect of differential industry demand changes. Change in unit labor cost and in unit materials cost are introduced to pick up the effect of differential industry direct input cost changes.

The "administered price" cyclical stability hypothesis is generally interpreted to predict a negative relationship between price change and concentration during cyclical expansions and a positive relationship during cyclical contractions.

Several such studies have been done for various time intervals within the period 1967 to 1972. 1/ They have yielded ambiguous and conflicting results. It is my view that such ambiguity and conflict in large measure may reflect econometric specification or measurement error. The purpose of the present report is to present the results of an application of this same general sort of model in which these apparent problems were avoided.

1/ For a review of these studies, see Beals (1975).

The period 1967 to 1972 is interesting because it included a heated cyclical expansion, a rather severe recession, a second expansion, and the beginning of an extended wage, price, and profit margin control period. The basic questions in which we are interested are: (1) Did industrial prices during this period behave in accordance with the cyclical stability or lag and catch-up versions of the administered pricing hypothesis? (2) Was the pricing behavior of firms in highly concentrated industries responsible for the industrial price inflation during this period?

Section II of the report summarizes the findings of the previous studies and critiques their methodology. Section III discuses the model and the data employed here, Section IV discusses the empirical findings, and Section V summarizes and concludes.

II. Summary of Findings and Methodology of Previous Studies

Several multiple regression studies of the type mentioned above have analyzed the relationship between price change and concentration for portions of the time period selected for study here. Weiss (1971) found a statistically significant negative relationship between price change and concentration from 1967 to 1968. Dalton (1973) found a significant positive relationship between price change and concentration over the period 1967 to 1969. Cagan (1974) found a statistically significant negative relationship for 1967 to 1969, a non-significant negative relationship for 1969 to 1970, and a positive significant relationship for 1970 to 1971. A negative significant relationship for

1966 to 1969 and a negative non-significant relationship for 1969 to 1970 were found by Weston and Lustgarten (1974). Charles Guy (1975) found non-significant negative relationships between price change and concentration for 1968 to 1972 and 1971 to 1972. Licari and Shen (1975) found non-significant relationships, negative for 1966 to 1969 and positive for 1969 to 1970.

The basic regression model which all the studies have been interested in estimating is

$$\Delta P = \beta_0 + \beta_1 CP + \beta_2 \Delta UMC + \beta_3 \Delta ULC + \beta_4 \Delta Q + u \qquad (1)$$

where ΔP is the percentage change in price over the time interval, CR is the industry concentration ratio, ΔUMC is percentage change in materials cost per unit of output, ΔULC is percentage change in labor cost per unit of output, and ΔQ is percentage change in output. The authors of most of the studies, however, have estimated the following equation with the variables in ratio form:

$$P_1/P_0 = \beta_0 + \beta_1 CR + \beta_2 UMC_1/UMC_0 + \beta_3 ULC_1/ULC_0 + \beta_4 Q_1/Q_0 + u \qquad (2)$$

where the subscript 1 refers to the last year of the time interval and 0 refers to the initial year. 2/

2/ Previous studies have calculated the unit cost terms from Census of Manufactures and Annual Survey of Manufactures data as

$UMC_1/UMC_0 = (CM_1/Q_1)/(CM_0/Q_0) = [CM_1/(VS_1/P_1)]/[CM_0/(VS_0/P_0)]$

$= (CM_1/CM_0) \cdot (VS_0/VS_1) \cdot (P_1/P_0)$ and analogously, ULC_1/VLC_0

$= (W_1/W_0) \cdot (VS_0/VS_1) \cdot (P_1/P_0)$

where CM, W, and VS are Cost of Materials, Wages, and Value of Shipments respectively. P is the price index. The change in output term is

$Q_1/Q_0 = (VS_1/P_1)/(VS_0/P_0) = (VS_1/VS_0) \cdot (P_0/P_1)$

Estimating Equation 2 yields, with the exception of the intercept (constant) term, the same coefficient estimates as estimating Equation 1. This is not true, however, if labor cost and materials cost components are weighted in accordance with their proportional importance in total cost. Weighting the cost components of Equations 1 and 2 gives rise to regression slope coefficient estimates for Equation 2 that are different from those for Equation 1, if the weights vary across industries. Equation 1 presumably is the theoretical relationship that one is interested in estimating. If the cost components are weighted, estimating Equation 2 gives biased estimates of the coefficients in Equation 1. 3/

Weighting the cost components is important, however, for the obvious reason that a given percentage change in, say, labor cost would be expected to have a smaller impact on price in industry i than in industry j if labor cost were a smaller proportion of total cost in industry i than in in industry j. But if weights are used, Equation 1 must be directly estimated with the percentage changes pre-calculated. Of those mentioned above, Dalton was the only author to weight the cost component variables. Beals (1975) alleges that Dalton may have estimated Equation 2 and that his results therefore may have been biased. An inspection of Dalton's raw data, however, clearly indicates that he estimated Equation 1 directly with the variables in percentage change form rather than ratio form.

3/ For a proof of this proposition, see Beals (1975, appendix C).

Another methodological problem involves the use of the change in output variable to pick up differential demand changes. Differential changes in output result not only from differential demand changes but also from interindustry differences in pricing behavior--a phenomenon which the model seeks to explain and which, by hypothesis, is related to market structure. An obvious way to avoid this blatant simultaneity problem and the estimate biases that result, is to substitute demand characteristic dummy variables for the change in output variable. Furthermore, previous studies may have contained severe biases resulting from use of Census of Manufactures and Annual Survey of Manufactures data entries for cost of Materials and Wages, and from the use of raw Census concentration ratios rather than ratios which had been adjusted to account for market definitional problems in the Standard Industrial Classification. The first of these is discussed below, and the second is discussed below and in the Appendix.

Finally, it is my view that an econometric formulation which specifies a linear relationship between price change and seller concentration may yield erroneous results. The basic "administered pricing" view predicting such a relationship appears to run thusly. Industries of low seller concentration are presumed to behave in the manner of purely competitive industries with demand induced price changes rapidly responding along short run industry supply functions. Industries of higher seller concentration, on the other hand, are presumed to be more

"oligopolistic" with pricing behavior characterized by "stability" in the face of changing demand. Price stability is thought to result from problems of interfirm pricing coordination--uncertainties of conjectural variations in a milieu of suspicion and mistrust of rival firms' motives and actions. In a period of expanded demand, individual firms may be reluctant to increase prices fearing that others will not have recognized the change in market demand conditions and may fail to increase their prices. In response to falling demand, individual firms may be reluctant to reduce prices fearing a misinterpretation of their intent and a resulting outbreak of price warfare.

These problems of coordination may not occur with regard to pricing in response to input price changes. Assuming that they engage in significant input price search, firms are aware when input prices change and no firm needs to fear that an output price response will lead to a breakdown in pricing coordination. Indeed, oligopolistic cyclical price stability is typically thought to result from firms adopting hard and fast pricing rules such as "standard unit cost plus customary markup" in order to facilitate pricing coordination.

It is typically presumed that the higher the degree of seller concentration, the more "oligopolistic" is the industry, and the greater is the tendency toward pricing stability--or price-cost margin stability. This leads to the prediction of a monotonic relationship between price change and seller concentration (after controlling for changes in direct costs)--negative in periods of cyclical expansion and positive in subsequent periods of stability or contraction.

The foregoing misses an important consideration. Industries in which seller concentration is sufficiently low so that firms behave as truly competitive "price-takers" should indeed exhibit considerable price flexibility. However, not all oligopolies are alike, and over the concentration range consistent with "oligopoly," the positive relationship between price stability and seller concentration posited above may be precisely backwards. High concentration fosters an interfirm flow of information and a milieu of mutual trust. Here, coordinated pricing behavior in the industry may approximate monopoly behavior and the degree of price flexibility characteristic of monopoly may result. Information flows are likely to be severely limited, and uncertainty

and mistrust should be very great, in oligopolistic industries of moderate to low seller concentration, not in very highly concentrated oligopolies. As stated by Joe Bain, "Moderate concentration...should tend to give rise to imperfect collusion (and) kinked demand curve conformations...whereas high concentration should provide an environment conducive to effective collusion or its equivalent." (1950, p. 43)

With "effective collusion" in highly concentrated oligopolies, firms may be able to shave prices relative to cost during demand contractions and increase prices relative to costs during demand expansions without destroying interfirm coordination. With "imperfect collusion and kinked demand curve conformations" in oligopolies of moderate concentration, firms may be forced to adopt and rigorously follow some hard and fast pricing rule such as "standard unit cost plus customary markup" in order to effectuate pricing coordination and avoid the profit and loss extremes of "pure competition." For oligopolies, the relationship between cyclical price stability and seller concentration may be negative. 4/

If this is the case, the relationship between price change and concentration may be U-shaped for cyclical expansions, and ∩-shaped for cyclical contractions. Firms in industries of neither very low concentration (atomistic competition?) nor very high concentration (well-coordinated oligopoly--in effect, joint monopoly) may be

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4/ For a more in depth discussion of this market structure and pricing behavior model, see Qualls (1976).

reluctant to raise price in expansions or reduce price in contractions. And in this event, it is a logical possibility that mere sample bias might lead to conflicting findings in those studies in which a monotonic relationship between price change and concentration is postulated. If the sample for one study was loaded in the direction of low concentration and the sample for another was loaded in the direction of high concentration, the first study might estimate the left-hand portion of the U (or the $\cap$) and the second might estimate the right-hand portion of the U (or the $\cap$). These would appear as diametrically opposed findings. A study using a sample fairly representing the range and distribution of the concentration universe might find no relationship. A possible non-monotonicity should be investigated.

III. The Basic Regression Model and the Data

In light of the discussion above, the basic cross sectional regression equation utilized here is

$$P_1/P_0 = \beta_0 + \beta_1 CR + \beta_2 CRSQ + \beta_3 AVC_1/AVC_0 + \beta_4 HB + \beta_5 MB + \beta_6 LYE + \beta_7 ND + \beta_8 GG + U \quad . \qquad (3)$$

P is the annual average Bureau of Labor Statistics four-digit SIC Wholesale Price Index. These indices are currently available for 90 four-digit industries back to 1967. Our sample consists of only 85 of these however. Five industries had to be deleted owing to SIC definitional changes in the 1972 Census of Manufactures.

CR is the industry four-firm concentration ratio for 1967. In some cases, either the product definition of the SIC four-digit industry was inappropriate or the "relevant market" was regarded as being local or regional in nature. In these cases, the four-firm concentration ratio

was adjusted so as to reflect concentration in relevant markets more closely. 5/

CRSQ is the four-firm concentration ratio squared. This is entered in some regressions in order to test for the hypothesized possible U-shaped (or ∩-shaped) relationship.

AVC is variable cost per unit of output, including both a materials cost component and a labor cost component, calculated from Annual Survey of Manufactures and Census of Manufactures data as

(Value of Shipments - Value Added + Wages)/Q

where

$$Q = (\text{Value of Shipments})/P$$

There are a couple of potentially very important advantages to combining materials cost and labor cost into one variable cost term. First, given the way Value Added is calculated by the Census, (VS -VA + W) is equal to the materials cost and labor cost in goods actually shipped. Census entries for Cost of Materials (CM) and Wages (W) are the totals put into production, not only for goods actually shipped but also that going into (plus or minus) "work in process" and "finished goods" inventories build-up or draw-down. Since inventory

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5/ A listing of the industries, their adjusted concentration ratios (and the bases of such adjustments), and the estimates of the heights of their barriers to entry are contained in the Appendix.

change is likely to be, in part, a function of relative price behavior--the phenomenon being explained on the left-hand side--the previous studies which have used CM and W for cost variables on the right-hand are subject to possible simultaneity bias. Even if inventory change were not a function of relative price behavior but instead occurred randomly, the unit cost variables would still contain measurement error since Q, by which CM and W are divided, is calculated as Value of Shipments (rather than Value of Production including inventory change) deflated by the price index. Our approach avoids this simultaneity or measurement error problem.

A second factor is that combining the two cost components into one variable automatically weights them implicitly and at the same time allows the model to be legitimately estimated with the price and cost variables in ratio form. 6/

The barrier to entry in each industry was classified as "high," "medium" or "low." In making these estimates, reliance was placed on previous estimates of Bain (1956), Mann (1966), Shepherd (1970), Qualls (1972), and Palmer (1973). Where differences of opinion existed, they

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6/ Unfortunately, the cost variable contains the dependent variable, P_1/P_0, as a deflator. This unavoidable situation occured in previous studies also. Although this may artificially inflate the R^2, the main concern is with the effect of concentration on price change, so the problem is of secondary importance. See Weiss (1966, note 5).

were reconciled in accordance with the author's judgment. HB and MB are 0-1 dummy variables for high barriers and medium barriers respectively. Although it is not really clear to me why, some writers have alleged that limit pricing considerations may lead to cyclical price stability. Therefore, the barrier to entry dummies are entered. 7/

CG is a dummy variable to split consumer good from producer good industries. ND is a dummy to split non-durable from durable goods industries, and LYE is a dummy variable assuming a value of 1 for those industries which should exhibit very low short run income elasticities of demand. Consumer good and non-durable good classifications, with a few exceptions, were taken from the Federal Reserve's Index of Industrial Production. Industries were designated as LYE on the basis of author's guesswork backed up by very low short run expenditure elasticity estimates from Houthakker and Taylor (1970). These were entered in hopes of picking up differences in cyclical demand behavior. This approach avoids the simultaneity problem, discussed above, in using output change as a demand variable on the right-hand side. 8/

7/ For a discussion of the alleged role of entry barriers, see Qualls (1976).

8/ One presumably would expect demand to be less variable, cyclically, in LYE industries than in non-LYE industries, in consumer good industries than producer good industries, and in non-durable good industries than in durable good industries.

IV. Empirical Results

Several regressions of the form indicated in Equation 3 were run with various combinations of the independent variables. A separate set was run for each year, 1968 through 1972, with the preceding year, 1967 through 1971, taken as the beginning year of the time interval. In addition, a separate set was run for each year, 1969 through 1972, with 1967 taken as the base year of the time interval. The regressions for year-to-year price changes may tend to reflect short run cyclical behavior, whereas the longer period regressions may reflect the cumulative effects of lags and catchups. The results are displayed in Table 1 through Table 9.

As a general matter, the barrier to entry dummy variables, HB and MB, are not statistically significant and add very little to the explanatory power of the regressions. The demand characteristic variables, LYE, ND, and CG, do not always have the expected signs and are rarely statistically significant. One would expect their coefficients to be negative in upswings and positive in recessions. The unit cost variable is always highly significant and appears to be the most important explanatory variable in the equations. Apart from this, concentration and concentration-squared appear as significant for some of the time intervals but not for others.

As indicated by the equations in Table 1, there is a very weak and nonsignificant negative relationship between concentration and price change over 1967 to 1968. From 1968 to 1969, however, the relationship between price change and concentration is much stronger and more

interesting. In Equations 2-1 through 2-4 in Table 2, the estimated coefficients for the concentration term are negative and significant and the coefficients for the concentration-squared term are positive and significant. This indicates a U-shaped relationship between price change and concentration, in keeping with the argument stated above. Above four-firm concentration of approximately 60 percent, the estimated relationship is positive. Below this concentration level, the estimated relationship is negative.

This U-shaped relationship also shows up for the two year interval, 1967 to 1969. In Equations 3-1 through 3-4 in Table 3, the concentration coefficients are negative and the concentration-squared coefficients are positive. The levels of statistical significance are lower, however, than for those in Table 2 for 1968 to 1969.

The time period from 1967 through 1969 was one of, if not continuous expansion, at least stable buoyancy. 1970, however, was a year of rather severe contraction with NBER trough being placed in November. If there is anything to the notion that differences in market structure lead to differences in cyclical price behavior, one should expect all signs to reverse for 1969 to 1970. This appears to happen. Concentration coefficients are positive and concentration-squared coefficients are negative in Equations 4-1 through 4-4 in Table 4. (The t-values are rather low, however.) This indicates a $\cap$-shaped relationship between price change and concentration for 1969 to 1970.

The conventional "administered pricing" view would predict that prices in the more highly concentrated industries should lag behind in the earlier expansion period, and then begin "catching up" in the subsequent recession. Here it appears, however, that it was prices in

industries in the middle concentration range which lagged behind and then started catching up during the following contraction.

Over the three year period from 1967 to 1970, the relationship between price change and concentration does not seem to be either U-shaped or ∩-shaped. In Equations 5-1 through 5-4 in Table 5, both the concentration coefficients and the concentration-squared coefficients are negative, small, and nonsignificant. In Equations 5-5 through 5-8 where the concentration-squared terms are dropped out, the concentration coefficients are negative and significant, although their values are comparatively small. This means that although the effect was not very pronounced, there was a linear tendency for higher degrees of concentration to be associated with smaller price changes. This seems to be at odds with the conventional administered price stability and concentrated industry price lag view. That view presumably would hold that in 1967, an early expansion year, unconcentrated industry prices should have been pushing ahead of concentrated industry prices, whereas in 1970, a later contraction year, concentrated industry prices should have been increasing relative to unconcentrated industry prices. This would predict a likely positive relationship between price change and concentration from 1967 to 1970. The negative relationship fails to support this view. And this conclusion is strengthened by comparing Equations 3-5 through 3-8 (Table 3) with Equations 5-5 through 5-8 (Table 5). As indicated there, the estimated negative relationship between price change and concentration is steeper for the 1967 to 1970 period than for the 1967 to 1969 period.

As indicated by the regressions in Table 6, concentration and price change are weakly and nonsignificantly positively related for 1970 to 1971. The traditional administered pricing view presumably would predict a negative relationship since 1971 represented an expansion relative to the contraction year of 1970. Our findings are to the contrary.

Table 7 indicates that the relationship over the whole period, 1967 to 1971, is weakly negative.

Equations 8-5 through 8-8 in Table 8 indicate a statistically significant negative relationship between concentration and price change from 1971 to 1972. This finding is amenable to either of two alternative interpretations. First, it is consistent with the administered price hypothesis that concentrated industry price changes will lag behind unconcentrated industry price changes in periods of expansion. Second, it may reflect the impact of Phase II price controls in late 1971 and 1972. Phase II aimed at maintaining price-cost margins at pre-1971 levels. So-called Tier I firms (those with annual sales of $100 million or more) were required to pre-notify the Price Commission of any planned price increases and file price-cost margin accounting reports. Tier II firms (those with annual sales between $50 and $100 million) were required to file quarterly reports. Tier III firms (those with sales less than $50 million) were not required to file reports. They were only required to maintain accounting data records from which price-cost margins might

be calculated. And firms with less than 60 employees were completely exempt from any price standards. The impact of the controls program may have been considerably weaker on the smaller firms.

Although there is no one-to-one correspondence, there is a tendency for smaller firms (in absolute size) to be more important in less concentrated industries. Moreover, a likely discretionary criterion for the Price Commission in deciding whether or not to take action against any one firm may have been the degrees of concentration in the firm's industrial markets. On balance, more comprehensive and vigorous action may have been taken against price increases in concentrated industries. Since price change during the expansion of 1971 was positively related to concentration, I think it more likely that the negative relationship for 1971 to 1972 mainly reflects the impact of the Phase II controls rather than a concentrated industry "administered price" lag.

A comparison of Equations 9-5 through 9-8 in Table 9 with Equations 7-5 through 7-8 in Table 7 indicates that the negative relationship between price change and concentration for the 1967 to 1972 period was much stronger and statistically more significant than that for the 1967 to 1971 period. Adding in the negative relationship for 1971 to 1972 clearly makes the cumulative negative effect of concentration appear much stronger.

Table 1

Regression Results, Industrial Wholesale Price Changes, 1967-1968

Equation Number	Dependent Variable	Intercept	CR	CRSQ	AVC_{68}/AVC_{67}	HB	MB	LYE	ND	CG	R^2	F
1-1	P_{68}/P_{67}	.61032 (13.89820)	-.00056 (-1.05635)	.00000 (.82322)	.42114*** (10.24930)						.573	36.1673 (3,81)
1-2	P_{68}/P_{67}	.60758 (13.58610)	-.00062 (-1.11597)	.00000 (.96891)	.42468*** (10.06650)	-.00729 (-.74599)	-.00031 (-.05730)				.576	21.4472 (5,79)
1-3	P_{68}/P_{67}	.61913 (13.48740)	-.00050 (-.91385)	.00000 (.73072)	.41186*** (9.47568)			-.00493 (-.67168)	-.00251 (-.39321)	.00177 (.32523)	.580	17.9137 (6,78)
1-4	P_{68}/P_{67}	.617288 (13.18600)	-.00053 (-.92913)	.00000 (.83623)	.41392*** (9.28710)	-.00721 (-.72530)	-.00111 (-.20135)	-.00486 (-.64684)	-.00250 (-.38865)	.00217 (.39096)	.582	13.2478 (8,76)
1-5	P_{68}/P_{67}	.60136 (14.16320)	-.00013 (-1.19195)		.42031*** (10.25240)						.569	54.1255 (2,82)
1-6	P_{68}/P_{67}	.59902 (13.66930)	-.00010 (-.73584)		.42166*** (10.02610)	-.00552 (-.57514)	-.00105 (-.19875)				.571	26.5947 (4,80)
1-7	P_{68}/P_{67}	.61227 (13.66660)	-.00011 (-.93016)		.40981*** (9.47622)			-.00470 (-.64372)	-.00309 (-.49083)	.00216 (.40048)	.577	21.5166 (5,79)
1-8	P_{68}/P_{67}	.61116 (13.24380)	-.00007 (-.48623)		.40993*** (9.26888)	-.00567 (-.58190)	-.00178 (-.32628)	-.00486 (-.64723)	-.00309 (-.48399)	.00241 (.43635)	.579	15.0995 (7,77)

(t-ratios are in parentheses)

*Significant at .1 or better (two-tailed test)
**Significant at .05 or better (two-tailed test)
***Significant at .01 or better (two-tailed test)

Table 2

Regression Results, Industrial Wholesale Price Changes, 1968-1969

Equation Number	Dependent Variable	Intercept	CR	CRSQ	AVC_{69}/AVC_{68}	IIB	MB	LYE	ND	CG	R^2	F
2-1	P_{69}/P_{68}	.79322 (10.2306)	-.00231** (-2.50735)	.00002* (1.94018)	.30004*** (4.72430)						.401	18.0417 (3,81)
2-2	P_{69}/P_{68}	.81786 (10.21480)	-.00278*** (-2.88194)	.00002** (2.28976)	.28306*** (4.33790)	-.00449 (-.28601)	.01182 (1.42029)				.420	11.4600 (5,79)
2-3	P_{69}/P_{68}	.84054 (10.03030)	-.00251*** (-2.65036)	.00002** (2.14260)	.25935*** (3.79422)			-.02001 (-1.62728)	.00517 (.52525)	.00166 (.19702)	.422	4.9503 (6,78)
2-4	P_{69}/P_{68}	.85558 (9.95934)	-.00288*** (-2.92917)	.00002** (2.40887)	.24890*** (3.55335)	-.00638 (-.40236)	.00990 (1.15904)	-.01774 (-1.42277)	.00402 (.40726)	.00358 (.41795)	.437	7.3834 (8,76)
2-5	P_{69}/P_{68}	.70672 (10.95800)	-.00056*** (-3.00850)		.34453*** (5.72126)						.373	24.3593 (2,82)
2-6	P_{69}/P_{68}	.70585 (10.85190)	-.00063*** (-2.90182)		.34451*** (5.64464)	.00454 (.29114)	.00915 (1.08246)				.382	12.3588 (4,80)
2-7	P_{69}/P_{68}	.73405 (10.64030)	-.00052*** (-2.70730)		.31737*** (4.94582)			-.01555 (-1.25451)	.00161 (.16211)	.00365 (.42540)	.388	10.0206 (5,79)
2-8	P_{69}/P_{68}	.72856 (10.42240)	-.00057** (-2.54325)		.32130*** (4.92702)	.00322 (.20373)	.00772 (.88173)	-.01339 (-1.05314)	.00053 (.01525)	.00465 (.52779)	.394	7.1625 (7,77)

(t-ratios are in parentheses)

*Significant at .1 or better (two-tailed test)
**Significant at .05 or better (two-tailed test)
***Significant at .01 or better (two-tailed test)

Table 3

Regression Results, Industrial Wholesale Price Changes, 1967-1969

Equation Number	Dependent Variable	Intercept	CR	CRSQ	AVC_{69}/AVC_{67}	IB	MB	LYE	ND	CG	R^2	F
3-1	P_{69}/P_{67}	.58383 (8.01587)	-.00179* (-1.71644)	.00001 (1.16238)	.50561*** (8.81288)						.573	36.1924 (3,81)
3-2	P_{69}/P_{67}	.58581 (7.97160)	-.00215** (-1.99682)	.00001 (1.41330)	.50779*** (8.77567)	-.00182 (-.10024)	.01245 (1.26929)				.583	22.1091 (5,79)
3-3	P_{69}/P_{67}	.60376 (7.71693)	-.00181* (-1.69512)	.00001 (1.19166)	.48681*** (7.85400)			-.01146 (-.81290)	.00014 (.01179)	.00433 (.43147)	.578	17.7780 (6,78)
3-4	P_{69}/P_{67}	.59942 (7.57111)	-.00211* (-1.93043)	.00001 (1.40688)	.49293*** (7.83634)	-.00326 (-.17577)	.01178 (1.15049)	-.00789 (-.54721)	-.12918 (-.11111)	.00626 (.61401)	.587	13.4967 (8,76)
3-5	P_{69}/P_{67}	.53742 (8.80294)	-.00060*** (-2.82599)		.52370*** (9.46338)						.566	53.3844 (2,82)
3-6	P_{69}/P_{67}	.52872 (8.55953)	-.00067*** (-2.69556)		.53040*** (9.47915)	.00355 (.19869)	.01096 (1.11705)				.573	26.8030 (4,80)
3-7	P_{69}/P_{67}	.55384 (8.35944)	-.00056** (-2.53447)					-.00977 (-.69436)	-.00103 (-.08881)	.00507 (.50536)	.570	20.9382 (5,79)
3-8	P_{69}/P_{67}	.54079 (7.98276)	-.00062** (-2.37149)		.51660** (8.46929)	.00214 (.11710)	.01048 (1.02107)	-.00652 (-.45057)	-.00228 (-.19529)	.00645 (.62815)	.576	14.9520 (7,77)

(t-ratios are in parentheses)

*Significant at .1 or better (two-tailed test)
**Significant at .05 or better (two-tailed test)
***Significant at .01 or better (two-tailed test)

Table 4

Regression Results, Industrial Wholesale Price Changes, 1969-1970

Equation Number	Dependent Variable	Intercept	CR	CRSQ	AVC_{70}/AVC_{69}	HB	MB	LYE	ND	CG	R^2	F
4-1	P_{70}/P_{69}	.63656 (8.50393)	.00068 (.76141)	-.00001 (-1.02902)	.38312*** (5.50087)						.283	10.6783 (3,81)
4-2	P_{70}/P_{69}	.60988 (7.92481)	.00104 (1.13563)	-.00001 (-1.35344)	.40470*** (5.67966)	.00209 (.12967)	-.01231 (-1.37740)				.304	6.9120 (5,79)
4-3	P_{70}/P_{69}	.63170 (8.07748)	.00065 (.73095)	-.00001 (-1.10090)	.39272*** (5.49798)			.02989** (2.51506)	-.01287 (-1.26669)	-.00716 (-.80350)	.339	6.6804 (6,78)
4-4	P_{70}/P_{69}	.61568 (7.66684)	.00094 (1.02377)	-.00001 (-1.35934)	.40566*** (5.55554)	.00325 (.20332)	-.00980 (-1.09885)	.02740** (2.26850)	-.01200 (-1.17202)	-.00848 (-.95687)	.353	5.1858 (8,76)
4-5	P_{70}/P_{69}	.65754 (9.12596)	-.00022 (-1.14719)		.38260*** (5.49133)						.274	15.4769 (2,82)
4-6	P_{70}/P_{69}	.64034 (8.65644)	-.00016 (-.74728)		.40111*** (5.60415)	-.00182 (-.11442)	-.01062 -1.19383				.288	8.0979 (4,80)
4-7	P_{70}/P_{69}	.65718 (8.78592)	-.00030 (-1.58603)		.38909*** (5.44576)			.02932** (2.46597)	-.01152 (-1.14060)	-.00812 (-.91387)	.329	7.7534 (5,79)
4-8	P_{70}/P_{69}	.64821 (8.43584)	-.00027 (-1.19899)		.39986*** (5.45552)	-.00049 (-.03112)	-.00810 (-.91237)	.02733** (2.25014)	-.01063 (-1.04047)	-.00909 (-1.00063)	.337	5.60094 (7,77)

(t-ratios are in parentheses)

*Significant at .1 or better (two-tailed test)
**Significant at .05 or better (two-tailed test)
***Significant at .01 or better (two-tailed test)

Table 5

Regression Results, Industrial Wholesale Price Changes, 1967-1970

Equation Number	Dependent Variable	Intercept	CR	CRSQ	AVC_{70}/AVC_{67}	HB	MB	LYE	ND	CG	R^2	F
5-1	P_{70}/P_{67}	.51760 (6.24178)	-.00083 (-.56448)	-.00000 (-.02490)	.57720*** (9.46873)						.565	35.0178 (3,81)
5-2	P_{70}/P_{67}	.51525 (6.06949)	-.00074 (-.47906)	-.00000 (-.01667)	.57831*** (9.32304)	-.00132 (-.05005)	-.00333 (-.23229)				.565	20.5172 (5,79)
5-3	P_{70}/P_{67}	.49159 (5.55006)	-.00058 (-.38635)	-.00000 (-.20341)	.59652*** (9.27349)			.02654 (1.31246)	-.01794 (-1.08594)	.00296 (.20594)	.575	17.6119 (6,78)
5-4	P_{70}/P_{67}	.49196 (5.47048)	-.00060 (-.38036)	-.00000 (-.17530)	.59673*** (9.14328)	-.00179 (-.06700)	.00004 (.00249)	.02662 (1.28104)	-.01800 (-1.06986)	.00312 (.21071)	.575	12.8718 (8,76)
5-5	P_{70}/P_{67}	.51878 (7.66727)	-.00087*** (-2.86578)		.57687*** (9.74994)						.565	53.1741 (2,82)
5-6	P_{70}/P_{67}	.51855 (7.55987)	-.00084** (-2.36300)		.57734*** (9.63424)	-.00165 (-.06429)	-.00319 (-.22637)				.565	25.9685 (4,80)
5-7	P_{70}/P_{67}	.50184 (6.93226)	-.00088*** (-2.79574)		.59389*** (9.54212)			.02617 (1.30721)	-.01752 (-1.07561)	.00265 (.18640)	.575	21.3855 (5,79)
5-8	P_{70}/P_{67}	.50085 (6.78833)	-.00087** (-2.32933)		.59406*** (9.42008)	-.00265 (-.10154)	.00037 (.02560)	.02643 (1.28155)	-.01771 (-1.06469)	.00297 (.20265)	.575	14.8937 (7,77)

(t-ratios are in parentheses)

*Significant at .1 or better (two-tailed test)
**Significant at .05 or better (two-tailed test)
***Significant at .01 or better (two-tailed test)

Table 6

Regression Results, Industrial Wholesale Price Changes, 1970-1971

Equation Number	Dependent Veriable	Intercept	CR	CRSQ	AVC_{71}/AVC_{70}	HB	MB	LYE	ND	CG	R^2	F
6-1	P_{71}/P_{70}	.48344 (6.53122)	.00029 (.30294)	-.00000 (-.04068)	.52444*** (7.51374)						.432	20.5620 (3,81)
6-2	P_{71}/P_{70}	.48648 (6.47110)	.00022 (.22050)	-.00000 (-.01373)	.52218*** (7.37446)	.00478 (.27057)	.00405 (.42299)				.434	12.1009 (5,79)
6-3	P_{71}/P_{70}	.46096 (5.95032)	.00048 (.49103)	-.00000 (-.18052)	.53596*** (7.46524)			.00729 (.55024)	-.00576 (-.52447)	.01457 (1.48208)	.453	10.7750 (6,78)
6-4	P_{71}/P_{70}	.46538 (5.91951)	.00030 (.29979)	-.00000 (-.03344)	.53314*** (7.31937)	.00133 (.07494)	.00709 (.72539)	.00917 (.67348)	-.00660 (-.59285)	.01524 (1.53293)	.457	8.0023 (8,76)
6-5	P_{71}/P_{70}	.48422 (6.81668)	.00025 (1.24543)		.52453*** (7.56492)						.432	31.2224 (2,82)
6-6	P_{71}/P_{70}	.48674 (6.73876)	.00021 (.87402)		.52222*** (7.42602)	.00473 (.27447)	.00406 (.43131)				.434	15.3177 (4,80)
6-7	P_{71}/P_{70}	.46460 (6.24892)	.00031 (1.46157)		.53625*** (7.51543)			.00719 (.54644)	-.00553 (-.51026)	.01423 (1.48127)	.453	13.0838 (5,79)
6-8	P_{71}/P_{70}	.46603 (6.15903)	.00027 (1.10106)		.53321*** (7.37143)	.00122 (.07048)	.00713 (.74071)	.00916 (.67774)	-.00657 (-.59580)	.01523 (1.54266)	.457	9.2655 (7,77)

(t-ratios are in parentheses)

*Significant at .1 or better (two-tailed test)
**Significant at .05 or better (two-tailed test)
***Significant at .01 or better (two-tailed test)

Table 7

Regression Results, Industrial Wholesale Price Changes, 1967-1971

Equation Number	Dependent Variable	Intercept	CR	CRSQ	AVC_{71}/AVC_{67}	IB	MB	LYE	ND	CG	R^2	F
7-1	P_{71}/P_{67}	.41963 (4.13757)	-.00006 (-.03624)	-.00001 (-.33384)	.66358*** (8.93295)						.511	28.2398 (3,81)
7-2	P_{71}/P_{67}	.41744 (4.01336)	.00001 (.02409)	-.00001 (-.36357)	.66464*** (8.77816)	.00384 (.12075)	-.00109 (-.06294)				.511	16.5367 (5,79)
7-3	P_{71}/P_{67}	.34412 (3.21895)	.00061 (.34217)	-.00001 (-.68350)	.70922*** (9.27446)			.03841* (1.63863)	-.02697 (-1.38248)	.02585 (1.49516)	.544	15.4764 (6,78)
7-4	P_{71}/P_{67}	.34761 (3.20252)	.00042 (.22544)	-.00001 (-.55337)	.70771*** (9.13155)	-.00197 (-.06259)	.00628 (.36116)	.04010* (1.66522)	-.02778 (-1.40024)	.02687 (1.51541)	.545	11.3560 (8,76)
7-5	P_{71}/P_{67}	.43871 (5.26382)	-.00064* (-1.75849)		.65836*** (9.11571)						.511	42.7672 (2,82)
7-6	P_{71}/P_{67}	.43910 (5.17808)	-.00065 (-1.51318)		.65836*** (8.97984)	.00176 (.05654)	-.00012 (-.00679)				.511	20.8643 (4,80)
7-7	P_{71}/P_{67}	.38527 (4.37619)	-.00058 (1.55121)		.69708*** (9.40379)			.03729 (1.59995)	-.02539 (-1.31498)	.02430 (1.42259)	.541	18.6038 (5,79)
7-8	P_{71}/P_{67}	.38097 (4.23969)	-.00058 (-1.31675)		.69782*** (9.29533)	-.00495 (-.16016)	.00764 (.44540)	.03970* (1.65699)	-.02678 (-1.36162)	.02609 (1.48265)	.543	13.0522 (7,77)

(t-ratios are in parentheses)

*Significant at .1 or better (two-tailed test)
**Significant at .05 or better (two-tailed test)
***Significant at .01 or better (two-tailed test)

Table 8

Regression Results, Industrial Wholesale Price Changes, 1971-1972

Equation Number	Dependent Variable	Intercept	CR	CRSQ	AVC_{72}/AVC_{71}	IB	MB	LYE	ND	CG	R^2	F
8-1	P_{72}/P_{71}	.68890 (11.03630)	-.00074 (-.81115)	.00000 (.25884)	.36299*** (6.89841)						.414	19.0432 (3,81)
8-2	P_{72}/P_{71}	.69633 (10.97770)	-.00083 (-.86567)	.00000 (.43791)	.35728*** (6.68721)	-.01490 (-.89492)	-.00236 (-.26254)				.420	11.4187 (5,79)
8-3	P_{72}/P_{71}	.68685 (10.86900)	-.00085 (-.91583)	.00000 (.34686)	.37263*** (6.88957)			-.01413 (-1.14687)	.00501 (.47100)	-.01050 (-1.16311)	.440	10.2050 (6,78)
8-4	P_{72}/P_{71}	.69287 (10.76200)	-.00081 (-.84023)	.00000 (.39233)	.36659*** (6.64841)	-.01200 (-.71651)	-.00570 (-.62255)	-.01515 (-1.19953)	.00555 (.52415)	-.01019 (-1.09981)	.445	7.6078 (8,76)
8-5	P_{72}/P_{71}	.68175 (12.24650)	-.00051*** (-2.67391)		.36476*** (7.03115)						.415	28.8595 (2,82)
8-6	P_{72}/P_{71}	.68385 (12.12790)	-.00042* (-1.87070)		.36060*** (6.85271)	-.01346 (-.82890)	-.00284 (-.32055)				.418	14.3706 (4,80)
8-7	P_{72}/P_{71}	.67697 (12.06780)	-.00053*** (-2.70504)		.37527*** (7.04715)			-.01390 (-1.13635)	.00452 (.43980)	-.01029 (-1.14876)	.439	12.3597 (5,79)
8-8	P_{72}/P_{71}	.68127 (11.97830)	-.00044* (-1.90204)		.37003*** (6.83518)	-.01069 (-.65504)	-.00613 (-.68703)	-.01507 (-1.19969)	.00509 (.48637)	-.01014 (-1.10130)	.434	8.7689 (7,77)

(t-ratios are in parentheses)

*Significant at .1 or better (two-tailed test)
**Significant at .05 or better (two-tailed test)
***Significant at .01 or better (two-tailed test)

Table 9

Regression Results, Industrial Wholesale Price Changes, 1967-1972

Equation Number	Dependent Variable	Intercept	CR	CRSQ	AVC_{71}/AVC_{67}	HB	MB	LYE	ND	CG	R^2	F
9-1	P_{72}/P_{67}	.23529 (2.39526)	.00103 (.54333)	-.00002 (-1.22242)	.82111*** (12.81800)						.688	5 5319 (5,81)
9-2	P_{72}/P_{67}	.23161 (2.29863)	.00112 (.56118)	-.00002 (-1.22021)	.82303*** (12.60170)	.00810 (.23965)	-.00002 (-.00131)				.688	34.8795 (5,79)
9-3	P_{72}/P_{67}	.19858 (1.96321)	.00160 (.83089)	-.00002 (-1.51220)	.84528*** (12.97180)			.04006 (1.58719)	-.03912* (-1.85993)	.00821 (.45259)	.703	30.7704 ,78)
9-4	P_{72}/P_{67}	.19798 (1.92253)	.00154 (.76250)	-.00003 (-1.43454)	.84620*** (12.77290)	.00785 (.23244)	.00519 (.27946)	.04108 (1.58407)	-.03957* (-1.84951)	.00833 (.44716)	.703	22.5279 (8,76)
9-5	P_{72}/P_{67}	.31165 (4.09862)	-.00124*** (-3.18303)		.80033*** (12.91940)						.692	88.0200 (2,82)
9-6	P_{72}/P_{67}	.31118 (4.03863)	-.00125*** (-2.72393)		.80016*** (12.75070)	-.00022 (-.00662)	.00309 (.17044)				.682	42.9646 (4,80)
9-7	P_{72}/P_{67}	.29686 (3.79925)	-.00125*** (-3.08848)		.81723*** (12.97720)			.03661 (1.44468)	-.03440 (-1.64059)	.00533 (.29305)	.694	35.8826 (5,79)
9-8	P_{72}/P_{67}	.29286 (3.68561)	-.00127*** (-2.67016)		.81818*** (12.83660)	-.00170 (-.05111)	.00852 (.45961)	.03910 (1.49957)	-.03581* (-1.67503)	.00694 (.37042)	.695	25.1072 (7,77)

(t-ratios are in parentheses)

*Significant at .1 or better (two-tailed test)
**Significant at .05 or better (two-tailed test)
***Significant at .01 or better (two-tailed test)

V. Summary and Conclusions

The regression analyses discussed above support the following conclusions.

First, the inflation of the late 1960s and early 1970s rather clearly appears not to have been of the market power "administered" type that, in the view of some, characterized the slower inflations of the mid-to-late 1950s and early 1960s. Indeed, the relation between concentration and price change over the whole period from 1967 to 1972 is clearly and significantly negative. Since the negative relationship between concentration and price change from 1967 to 1971 is much weaker and less significant, I am inclined to attribute a substantial portion of the 1967 to 1972 price change effect to the operation of the price controls program in 1972. Nevertheless, in the pre-controls period from 1967 to 1971, price increases in more highly concentrated industries, after allowing for changes in direct costs, clearly did not outstrip those in less concentrated industries. If anything, there was a slight tendency for them to lag behind.

Second, prices during the 1970 recession did not behave in accordance with a conventional administered pricing view. That view predicts a positive relationship between price change and industry concentration during recession. This phenomenon did not occur during 1970.

Third, some support was found for a U-shaped (or $\cap$-shaped) relationship of cyclical price behavior to seller concentration. There was a clearly significant U-shaped relationship between price change and seller

concentration for the 1968 to 1969 expansion, and although the statistical significance level was lower, a $\cap$-shaped relationship for the 1969 contraction. Previous studies have not tested for such relationships. Yet, this parabolic price response pattern can logically be rationalized on the basis of market structure theory. Future studies should investigate such a possibility.

APPENDIX

A major difficulty with the use of Census Bureau concentration ratios in market structure-performance studies is that the national ratios for four-digit "industries" may not reflect the degrees of concentration in "meaningfully defined" markets. Although there is, conceptually, no clear and precise method for defining an industrial market, it is nevertheless clear that some SIC industries are grossly ill-defined for our purposes. Some are too broadly defined in the sense that they include products which are only very distant substitutes for other products classified in the industry. Others are too narrowly defined in the sense that they exclude products which are close substitutes for products classified in the industry. Other "industries" may be too broadly defined on a geographical basis. Owing to high transportation costs or other factors, markets in some "industries" may tend to be local or regional in nature rather than national in scope.

As a general matter, although it is not always the case, there is a tendency for calculated concentration to understate concentration in more "relevantly" defined markets when industry definitions are too broad. If the industry definitions are too narrow, there is a general tendency for calculated concentration to overstate concentration in more relevantly defined markets.

Sometimes this problem is dealt with by deliberate sample selection. In his sample, the investigator includes industries for which the SIC

definitions are reasonably appropriate, Unfortunately, that approach could not be adopted here. Inclusion in the sample was determined by the availability of BLS Wholesale Price data. The approach taken here was to adjust the concentration ratios for those industries whose concentration ratios were judged to be poor reflections of meaningful concentration because of market definition problems.

William G. Shepherd (1970, Appendix Table 8) has provided, for each SIC four-digit industry, an estimate of whether the SIC industry definition is too broad or too narrow with regard to product inclusion. In addition, he indicates whether, in his view, the relevant market is local or regional in nature.

I also enlisted the aid of my colleague, F.M. Scherer, who was asked to render judgments such as these, independent of the Shepherd estimates, for each of the industries in the sample. In addition, I provided independent judgments of my own. Whether an individual industry's concentration ratio was to be adjusted, and on what basis, was determined essentially by majority vote among this three-person "panel of experts." Surprisingly (?), there was substantial agreement.

Generally, the adjustments were handled in the following manner. If the SIC four-digit industry was too broadly defined with regard to product inclusion, a weighted average (on the basis of value of shipments) of concentration ratios in component five-digit product classes was calculated and used as the CR observation in the study. If the four-digit

industry was too narrowly defined with respect to product inclusion, a weighted average of concentration in this industry and concentration in other four-digit industries in the same three-digit group was calculated and used as the CR observation. Five-digit product class value of shipments data, on which five-digit product class concentration ratios are based, exclude secondary product contamination (secondary product value of shipments for establishments included in the industry is excluded and value of shipments for products primary to the industry but arising in establishments classified in other industries is included). For reasons of consistency, four-digit ratios used as indicated above, and those used as CR observations for those industries whose ratios did not require adjustment, were taken from 1967 Census of Manufactures, Concentration Ratios in Manufacturing, Part 2, in which four-digit ratios are calculated on the same value of shipments basis as product-class ratios with secondary product contamination excluded. Actually, these ratios seem preferable as a general matter to those ratios calculated on the basis of four-digit industry data from which secondary product contamination has not been exculded, particularly for those cases in which industry specialization and/or coverage are low.

For industries which were judged to be regional or local in nature, weighted averages of regional or state ratios were calculated. Unfortunately, such ratios are available only for 1963 rather than 1967. In a few cases, the weighted average 1963 ratios were adjusted for changes that had occurred in national concentration between 1963 and 1967.

The industries and their concentration ratios (as adjusted where appropriate), along with the estimated heights of their barriers to entry, are listed in Table A-1.

Table A-1

SIC	Industry	Four-Firm Concentration, %	Barrier to Entry
2011	Meat slaughtering	27	Low
2013	Meat processing	15	Low
2015	Poultry dressing	15	Low
2021	Creamery butter a/	50	Low
2033	Canned fruits and vegetables b/	37	Low
2036	Packaged fish b/	31	Low
2044	Rice milling	45	Low
2052	Biscuits, crackers, and cookies b/	59	Low
2061	Raw cane sugar c/	58	Medium
2062	Cane sugar refining c/	58	Medium
2063	Beet sugar c/	58	Medium
2073	Chewing gum	81	High
2082	Malt liquor d/	64	Medium
2083	Malt	42	Low
2084	Wines and brandy	48	Low
2091	Cottonseed oil mills	44	Low
2092	Soybean oil mills	55	Low
2094	Animal and marine fats and oils	18	Low
2096	Shortening and cooking oils b/	51	Medium
2098	Macaroni and noodle products	31	Medium
2111	Cigarettes	81	High
2121	Cigars	58	Medium
2131	Chewing and smoking tobacco	50	Low
2254	Knit underwear mills e/	45	Low
2272	Tufted carpets and rugs f/	33	Low
2311	Mens'and boys'suits and coats	17	Low
2321	Mens' dress shirts and nightwear	27	Low
2322	Mens'and boys' underwear e/	45	Low
2327	Mens' and boys' separate trousers	17	Low
2328	Work clothing	29	Low
2381	Fabric dress and work gloves g/	39	Low
2515	Mattresses and bed springs d/	39	Medium
2521	Wood office furniture f/	31	Low
2647	Sanitary paper products b/	67	Medium
2654	Sanitary food containers b/	61	Low
2822	Synthetic rubber	49	Medium
2823	Cellulosic man-made fibers f/	81	Medium
2824	Organic fibers, noncellulosic f/	81	Medium
2872	Fertilizers, mixing only h/	58	Medium
2892	Explosives	67	High
2911	Petroleum refining d/	52	Medium
3111	Leather tanning and finishing	20	Low

Table A-1 continued

SIC	Industry	Four-Firm Concentration, %	Barrier to Entry
3221	Glass containers a/	80	Low
3241	Cement, hydraulic h/	72	Medium
3251	Brick and structural clay tile h/	66	Low
3255	Clay refractories	43	Low
3259	Structural clay products, nec a/	55	Low
3261	Vitreous plumbing fixtures	61	Low
3262	Vitreous china food utensils f/	60	Low
3263	Fine earthenware and food utensils f/	60	Medium
3271	Concrete block and brick h/	30	Medium
3273	Ready-mixed concrete h/	33	Medium
3275	Gypsum products	78	Medium
3312	Blast furnaces and steel mills a/	80	Medium
3315	Steel wire drawing	38	Medium
3316	Cold finishing of steel shapes	35	Medium
3317	Steel pipe and tube a/	55	Medium
3333	Primary zinc	59	Medium
3334	Primary aluminum	91	Medium
3339	Primary non-ferrous metals, nec	60	Low
3351	Copper rolling and drawing	40	Medium
3411	Metal cans a/	90	Low
3423	Hand and edge tools, nec b/	30	Low
3431	Metal plumbing fixtures	43	Low
3493	Steel springs	34	Low
3498	Fabricated pipe and fittings	15	Low
3519	Internal combustion engines, nec b/	67	Medium
3533	Oil field machinery and equipment	24	Medium
3534	Elevators and moving stairways	58	Medium
3537	Industrial trucks and tractors	45	Medium
3562	Ball and roller bearings b/	71	Low
3576	Scales and balances	54	Medium
3612	Transformers b/	72	High
3613	Switchgear and switchboards b/	60	High
3624	Carbon and graphite products	86	High
3635	Household vacuum cleaners	62	Low
3641	Electric lamps	88	High
3652	Phonograph records	58	Medium
3671	Electron tubes, receiving	89	Medium
3672	Cathode ray picture tubes	84	Medium
3673	Electron tubes, transmitting	54	Medium
3674	Semi-conductors	46	Low
3692	Primary batteries	85	Medium
3693	X-ray apparatus and tubes	49	Medium
3717	Motor vehicles and car bodies b/	96	High

notes on next page

Table A-1 continued

Notes:

a/ Industrial markets are regional in nature, but regional ratios were not publicly available. CR is based on Shepherd's estimate (1970).

b/ Industry product definition is too broad. CR is a weighted average of ratios for conponent five-digit product classes.

c/ CR is a weighted average for the three sugar industries. They are close substitutes.

d/ Industrial markets are regional in nature. CR is a weighted average of regional ratios for 1963, perhaps slightly adjusted for changes in national concentration between 1963 and 1967.

e/ Industry product definitions are both too broad and too narrow. CR is a weighted average of ratios for component five-digit classes within both SIC 2254 and SIC 2322.

f/ Industry product definition is too narrow. CR is a weighted average of ratios for four-digit industries within the relevant three-digit group. For fibers, it is a weighted average of SIC and SIC 2823, and for food utensils, a weighted average of SIC 3262 and SIC 3263.

g/ CR is a weighted average of ratios for component five-digit product classes within both SIC 2381 and SIC 3151, Leather gloves.

h/ Industrial markets are local to regional in nature. CR is a weighted average of state ratios for 1963, perhaps slightly adjusted for changes in national concentration between 1963 and 1967.

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