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Revisited: Comment**



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Spatial Competition and Vertical Integration; Cement and Concrete Revisited: Comment

By RONALD N. JOHNSON AND ALLEN M. PARKMAN*

In this *Review* (1983), Mark McBride reconsiders the Federal Trade Commission's (FTC) enforcement policy toward vertical mergers between cement and ready-mix concrete firms. In response to a significant increase in acquisitions of ready-mix concrete firms by cement manufacturers during the 1960's, the FTC undertook a series of legal actions to block or dissolve the mergers. The actions of the FTC constituted one of the most intensive efforts undertaken to date to challenge vertical mergers in a single industry.¹ McBride (p. 1012) notes that the actions of the FTC provoked considerable debate concerning the motivation for the mergers both in the industry and in academe. A significant number of articles were published advancing various reasons for the mergers. In addition to the FTC's main contention that the mergers were motivated by a desire for captive markets, it has been suggested that there were economies of integration or that the mergers were the outcome of an erroneous view of the potential benefits to foreclosure held by executives in the beleaguered cement industry.² McBride's 1983 paper offers another explanation for the mergers. His argument is that vertical integration was undertaken to avoid rigid oligopolistic pricing in the cement industry.³ The empirical results presented by McBride suggest that vertical integration was a signifi-

cant factor in the decline of cement prices in the 1960's.

The purpose of this comment is to point out some of the problems with McBride's analysis. In particular, we show that the experimental design of his testing equation is faulty and does not offer a test of his hypothesis. As a result, McBride's analysis does not provide convincing evidence on whether cement firms vertically integrated to avoid rigid oligopolistic pricing, or if cement firms were merely reacting to prices that had already begun to decline. Our intent, however, is not to challenge McBride's contention that vertical integration can provide lower prices to consumers. Rather, we would argue that the evidence presented at the FTC hearings involving cement and ready-mix concrete firms as well as McBride's and others' analyses illustrate the problems in discerning the motives for mergers.⁴

I. Vertical Integration and Cement Prices

McBride's 1983 hypothesis is that integrated cement firms are in a position to make less visible and less readily matched reductions in the oligopolistically determined cement prices by cutting the price of ready-mix concrete. He also argues that integrated firms may "accept lower profits at the concrete level to avoid underutilization at the cement level" (p. 1017). However, in both cases, rivals will eventually detect and react to lost market shares, although the reaction is assumed to be slower than to direct cuts in the price of cement. The end result is that vertical integration weakens oligopolistic pricing discipline. Integration is

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¹See the *Economic Report...* of the FTC (1966).

²See, for example, Merton Peck and John McGowan (1967) and Bruce Allen (1971).

³Wesley Liebeler also argued that, "the most plausible explanation of mergers between cement and ready-mixed concrete firms seems to be a desire on the part of individual cement firms to increase their output by avoiding the oligopolistic price structure of the cement industry" (1968, p. 1201).

⁴Discerning the motives for a merger is of increasing importance as the Merger Guidelines now invite an economies defense. For a discussion of this policy change, see Oliver Williamson (1986).

TABLE 1—VERTICAL INTEGRATION AND CEMENT PRICES

Variable	Regressions			
	1	2	3	4
$UTIL_{i,t}$	-.244 (-2.35)	-.320 (-1.66)	-.562 (-3.08)	-.711 (-4.06)
$UTIL_{i,t-1}$	.175 (1.51)	.418 (2.22)	.252 (1.44)	.164 (0.96)
$UTIL_{i,t-2}$	.260 (2.64)	.366 (2.35)	-.048 (-.29)	-.096 (-.63)
$PLANTS_{i,t}$	-.038 (-2.25)	-.004 (-.21)	-.009 (-.50)	-.019 (-1.03)
$DINTG_{i,t}$	.021 (1.30)	.026 (1.46)	.013 (.79)	.038 (1.36)
$INTG_{i,t}$	-.026 (-3.71)	-.045 (-5.03)	-.011 (-1.07)	-.074 (-8.17)
Intercept	3.52 (15.98)	3.11 (12.52)	9.60 (7.47)	4.08 (16.59)
Time Trend			-.03 (-5.13)	
\bar{R}^2	.575	.504	.585	.608

Note: The t -statistics are shown in parentheses. The regressions included dummy variables for region of observation. Data on $UTIL$, $PLANTS$, and cement prices are from U.S. Bureau of Mines, *Minerals Yearbook*. Cement prices were deflated using the Producer's Price Index.

expected to have a negative effect on concrete prices and a lagged negative effect on cement prices (see McBride, p. 1018).

To test the above implications, McBride looks at yearly average cement prices net of transportation costs in seventeen different U.S. Bureau of Mines regions for the period 1958 through 1966. He does not attempt to look at concrete prices directly, but rather infers that concrete prices lead cement prices. The cross-sectioned time-series testing equation used by McBride contains a set of dummy variables to account for regional variations and a set of explanatory variables. Included in the testing equation were current and lagged measures of capacity utilization in region i and time period t , $UTIL_{i,t}$, the number of cement plants, $PLANTS_{i,t}$, and two variables, $DINTG_{i,t}$ and $INTG_{i,t}$, that measure the number of vertical mergers in region i , year t , and the cumulative number of acquisitions in region i prior to period t , respectively. The capacity utilization rate variables were included to test for price flexibility. According to McBride, if prices were highly flexible, as in the idealized competitive model, there should be no correlation between cement prices and lagged capaci-

ty utilization.⁵ The $PLANTS_{i,t}$ variable is McBride's proxy for the degree of competition. The variables $DINTG_{i,t}$ and $INTG_{i,t}$ are McBride's key variables. If "the estimated coefficients are negative, vertical integration is undermining oligopolistic price discipline and bringing prices down" (McBride, p. 1019).

Table 1 contains four regression runs using the variables defined above. The first regression results are those that appeared in McBride's 1983 article. The estimated coefficient on the variable $DINTG$ is not significantly different from zero at the 5 percent level, but the coefficient on $INTG$ is negative and significant. McBride's interpretation is that vertical integration did reduce prices but the process operated with a lag. Regression 2 is our attempt to reproduce McBride's estimates. Qualitatively, the results are very similar, but they do differ. One possible explanation is that our tabulations of vertical mergers or assignment to region differs from

⁵The difficulties inherent in relating rigid prices to policy implications are discussed by Dennis Carlton (1986).

that used by McBride.⁶ However, there is no need to quibble about an exact count of the mergers as a more fundamental estimation problem exists.

The basic problem with McBride's approach emanates from the fact that between 1958 and 1966 cement prices, in real terms, fell in each and every region. Thus, the dependent variable exhibits a downward trend while the prime explanatory variable, *INTG*, is by construction a nondecreasing variable. When a time trend variable was included (Regression 3) as a means for detrending the variables, the coefficient on *INTG* was no longer significant. While that suggests McBride's results may be spurious, the inclusion of a deterministic time trend may also suppress a variable that is in fact significant. However, the results shown by Regression 4 make it clear that McBride's experimental design is faulty as it is not capable of distinguishing fact from fiction. For Regression 4 we reconstructed the variable *DINTG* using randomly drawn numbers and then recomputed the variable *INTG*.⁷ The results, Regression 4, show that the signs on the coefficients of the variables *DINTG* and *INTG* are similar to that reported by McBride. In particular, the coefficient on the variable *INTG* remains negative and significant. Given that numerous runs using random numbers produced a similar significant result, it follows that the specification used by McBride is not capable of testing the hypothesis that vertical integration lowers cement prices. Furthermore, the general decline in cement prices commenced prior to most of the acquisitions and some of the regions experienced no vertical integration activity. Thus, it is unlikely that some other specification would reveal a convincing neg-

ative lag effect of vertical acquisition activity on cement prices.⁸

As a final point, we note that it is essential to McBride's argument that prior to the vertical acquisitions cement prices be determined in an oligopolistic environment. But, attempts to portray many of the markets in which vertical integration occurred as highly oligopolistic will have to deal with evidence to the contrary. For example, in 1964 there were eighteen cement manufacturers selling in the New York metropolitan area, an area that experienced more vertical merger activity than any other.⁹ The top four firms accounted for 53.4 percent of total shipments in the New York market and the top eight had 70.5 percent of the market.¹⁰ Also important is the general record of aggressive price competition and the entry of new firms in other regions.¹¹ In its final order in the *Marquette* case, the FTC argued that, "What evidence there is suggests that this merger was intended to secure an outlet for Marquette's cement and was in fact a response to increased competition and declining prices in the cement market."¹²

⁸We, like McBride, merely counted the mergers. The acquisitions, however, varied in both size and circumstances. Mergers such as that of Stewart Sand and Material Co. in Kansas City by Mississippi River Fuel Corp. illustrates another type of problem. Stewart was acquired in October of 1963; however, Mississippi River Fuel's only cement plant did not come on line until July of 1965. See *In the Matter of Mississippi River Fuel Corporation*, 75 F.T.C. 813 (1969) at 849. An additional problem has to do with McBride's use of regional prices. The implication of using those prices is that a vertical merger in a particular city is expected to have a significant impact on the regional price. Granted, a spatial competition model that implies a transmission of local price changes to other markets underlies McBride's analysis, but this does appear to be asking a lot, as only about 6 percent of all grey portland cement shipments in the United States were made to ready-mixed concrete firms owned by cement firms. See the *Economic Report...* of the FTC (p. 13).

⁹*In the Matter of Marquette Cement Manufacturing Company*, 75 FTC 32 (1969) at 48.

¹⁰*In the Matter of Marquette...*, at 51.

¹¹See, for example, *In the Matter of Ash Grove Cement Company*, 85 FTC 1123 (1975) and *In the Matter of Texas Industries, Inc.*, 68 FTC 992 (1965) for a discussion of mergers in Kansas City and Memphis.

¹²*In the Matter of Marquette...*, at 104.

⁶For the regressions shown in Table 1 we used McBride's tabulation of mergers (1979, Appendix A).

⁷For the results shown in Table 1, Regression 4, the variable *DINTG* was generated by assuming that the probability of a merger occurring in each year and in each region was .5. We also tried different probabilities and allowed for the possibility of two mergers in a given year. The results were similar to that reported in Table 1.

II. Conclusions

In this comment we have been critical of McBride's empirical analysis, arguing that his experimental design is not capable of testing the hypothesis that vertical integration reduced cement prices. We would also argue that given the limitations of the data, it may be difficult to come up with any convincing test. On more general grounds, however, McBride's contention that the vertical mergers in the cement industry were undertaken to avoid rigid oligopolistic pricing is troublesome. The record makes it difficult to conclude that many of the cement markets involved were of a tight oligopolistic nature. Our readings of the cases also suggest that speculation as to the motive for the mergers is likely to be endless as there are enough bits and pieces around to keep most of the hypotheses alive. The extensive amount of research done on the cement/ready-mix cases and the conflicting results shows how difficult it is to discern the motives for a merger. What is absent, however, is sufficient evidence that would demonstrate that the vertical mergers in the cement industry have or would create a significant probability of a harmful effect. Apparently, the FTC now concurs as the agency recently rescinded its enforcement policy regarding vertical mergers between cement and ready-mix concrete firms.¹³

¹³50 Federal Register 21507 (1985).

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